



AK ✓
JFW

PATENT
ATTORNEY DOCKET NO.: 08472/704002

Certificate of Mailing: Date of Deposit: November 29, 2005

I hereby certify under 37 CFR 1.8(a) that this correspondence is being deposited with the United States Postal Service as **first class mail** with sufficient postage on the date indicated above and is addressed to Mail Stop Appeal, Commissioner for Patents, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450.

Janet D'Annunzio-Ellis
Printed name of person mailing correspondence

Janet D'Annunzio-Ellis
Signature of person mailing correspondence

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Gary Ruvkun et al.	Art Unit:	1632
Serial No.:	08/908,453	Examiner:	Ram R. Shukla
Filed:	August 7, 1997	Customer No.:	21559
Title:	AGE-1 POLYPEPTIDES AND RELATED MOLECULES AND METHODS		

Mail Stop Appeal
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450.

APPEAL BRIEF
SUBMITTED PURSUANT TO 37 CFR § 41.37

In support of Appellants' Notice of Appeal filed October 3, 2005 of the Office's final rejection mailed on March 31, 2005, submitted herewith is Appellants' Appeal Brief.

12/01/2005 YPOLITE1 00000011 08908453

01 FC:2402

250.00 OP

TABLE OF CONTENTS

Real Party in Interest.....	Page 3
Related Appeals and Interferences.....	Page 3
Status of Claims	Page 3
Status of Amendments	Page 3
Summary of the Invention.....	Page 3
Issues	Page 5
Arguments	Page 5
Conclusion.....	Page 10
Claims Appendix	Page 11
Evidence Appendix	Page 13

Exhibit A filed November 17, 2003 and entered March 31, 2005¹

Exhibit B filed November 17, 2003 and entered March 31, 2005

Exhibit C filed November 17, 2003 and entered March 31, 2005

¹ In the Interview Summary mailed September 30, 2005, Examiner Shukla states that the papers filed on November 17, 2003 were considered by the Examiner while preparing the Office Action of March 31, 2003. Appellants submit that the Office Action referred to is the one mailed on March 31, 2005.

Real Party in Interest

The Real Party in Interest is The General Hospital Corporation, to which all interest in the present application has been assigned by virtue of an Assignment, recorded on July 23, 1998 (Reel/Frame 9334/0514).

Related Appeals and Interferences

There are no currently pending appeals or interferences related to this case.

Status of Claims

Claims 8, 10-13, 15, 16, 19, and 20 are currently pending. Claims 1-7, 14, and 21-28 are withdrawn from consideration. Claims 9, 17, 18, 29, and 30 were canceled

Claims 8, 10-13, 15, 16, 19, and 20 were finally rejected in a Final Office Action mailed on March 31, 2005, and are appealed.

Status of Amendments

All amendments have been entered and are reflected in the appended claims.

Summary of the Invention

Appellants' invention generally features a purified and isolated DNA encoding an AGE-1 polypeptide having PI-3 kinase activity, and methods of identifying compounds that decrease AGE-I expression or biological activity. Specifically, the claims on appeal are directed to the following compositions and methods:

(i) purified and isolated DNA encoding an AGE-1 polypeptide containing SEQ ID NO:1 (claim 8), and vectors and cells that include this DNA (claims 10 and 11, respectively);

(ii) methods of producing a recombinant AGE-1 polypeptide using the vectors and cells of the invention and recombinant polypeptides produced by such methods (claims 12 and 13, respectively);

(iii) screening methods for candidate compounds that require (a) a nematode cell expressing its endogenous AGE-1 DNA; (b) contacting the nematode cell with a candidate compound; and (c) measuring AGE-1 gene expression in the nematode cell, a decrease in AGE-1 gene expression following contact with the candidate compound, compared to AGE-1 gene expression in a nematode cell that is not contacted with the candidate compound, identifying the candidate compound as a compound that is capable of decreasing AGE-1 gene expression (claims 15, 19, and 20); and

(iv) screening methods for candidate compounds that require (a) a cell expressing a recombinant AGE-1 polypeptide; (b) contacting the cell with a candidate compound; and (c) measuring the PI 3-kinase activity of the cell, a decrease in AGE-1 PI 3-kinase activity of the cell following contact with the candidate compound, compared to AGE-1 PI 3-kinase activity in a cell that is not contacted with the candidate compound, identifying the candidate compound as a compound that is capable of decreasing AGE-1 PI 3-kinase activity (claims 16, 19, and 20).

Each of these claims is described in the specification. The amino acid sequence of an AGE-1 polypeptide, for example, is found at Figure 3 (SEQ ID NO:1), and the nucleic acid sequence of an AGE-1 cDNA is found at Figure 4. Cells and vectors containing a nucleic acid encoding an AGE-1 polypeptide and methods of using these cells and vectors for the production of recombinant AGE-1 polypeptides are provided at pages 28-29.

Methods for screening candidate compounds are provided in Appellants' specification at page 31, line 7 to page 34, line 7. In particular, at page 31, lines 15-17, Appellants teach methods for measuring AGE-1 expression. At page 31, lines 9-14, Appellants teach that AGE-1 expression may be measured following the addition of antagonist molecules either to culture medium or to an animal, for example, a nematode, and, at page 31, lines 17-19, Appellants teach that the level of AGE-1 expression in the presence of a candidate molecule is compared to the level measured for the same cells in the absence of the candidate molecule. In addition, Appellants teach methods for identifying compounds that modulate AGE-1 kinase activity *in vitro* at page 32, lines 8-

21. Methods for the selection of candidate compounds are provided at page 31, lines 19-21, and methods for purifying such compounds are provided at page 32, lines 1-7. Appellants teach that the usefulness of compounds that modulate AGE-1 expression can be confirmed by testing the compounds in animal models such as nematodes (page 33, lines 4 and 5). Finally, at page 33, lines 6-9, Appellants teach that selected compounds may be used as therapeutics to decrease the level of native AGE-1 expression and thereby increase the longevity of an animal, for example, a human.

Issues on Appeal

This appeal presents two issues:

- I. Whether the Office erred in rejecting claims 8, 10, and 11 as being anticipated by Swinburne (EMBL Accession No. Z66519, October 27, 1995); and
- II. Whether the Office erred in rejecting claims 8, 10-13, 15, 16, 19, and 20 as being obvious over Swinburne (EMBL Accession No. Z66519, October 27, 1995) in view of Johnson et al. (Genetica 91:65-77, 1993).

Arguments

The present anticipation and obviousness rejections are based on a central factual error that requires reversal. As is discussed below, these rejections turn on a primary reference by Swinburne and the assertion that this reference disclosed Appellants' AGE-1 amino acid sequence prior to Appellants' priority application filing date of August 7, 1996. This assertion is incorrect. The sequence provided by Swinburne was updated on multiple occasions from its initial submission in October 1995. As of Appellants' filing date, Swinburne had not submitted a full-length AGE-1 sequence, nor identified its function. This reference therefore cannot anticipate or render obvious Appellants' claims to the AGE-1 sequence of SEQ ID NO:1 or methods for identifying AGE-1 modulatory compounds that measure changes in its gene expression or PI-3 kinase activity. The rejections based on Swinburne must be reversed.

I. The Swinburne Reference Does Not Teach the Claimed Invention

The case law is clear that, to anticipate a claim, a prior art reference must disclose, either expressly or inherently, all of the limitations of the claim. *Kalman v. Kimberley-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983).

As indicated above, claim 8 is directed to purified and isolated DNA encoding an AGE-1 polypeptide that includes the sequence of SEQ ID NO:1, and claims 10 and 11 are directed to a vector and cell, respectively, that include that purified and isolated AGE-1 DNA. The Office has rejected these claims under 35 U.S.C. § 102(a) as being anticipated by Swinburne (GenBank Accession No. Z66519), asserting that this GenBank submission disclosed the amino acid sequence of SEQ ID NO: 1 as of October 27, 1995. This assertion is in error.

While it is true that the first Swinburne sequence submission occurred in October 1995,² the nucleic acid sequence of the cosmid “B0334” that is the subject of the submission underwent continual updating since it first became available. Exhibit A to Appellants’ Reply filed November 17, 2003 (and considered by the Examiner in the preparation of the March 31, 2005 Office Action) provides a sequence revision history, indicating that this submission was updated multiple times following Appellants’ priority application filing date of August 7, 1996. Exhibit B to Appellants’ Reply filed November 17, 2003 provides the version of Gene Bank Accession No. Z66519 available as of July 29, 1996, a deposit made just prior to the filing of Appellants’ priority document (U.S.S.N. 60/023,382). As shown in Exhibit B, at page 4, as of July 29, 1996, the polypeptide product of B0334.8 contained just *seventy-six* amino acids.³ In contrast, the AGE-1 polypeptide sequence of SEQ ID NO:1 contains *one thousand one hundred forty-six* amino acids. Thus, contrary to the Office’s assertion, the cited Swinburne reference Z55419 [gi:1044812] -- available as of Appellants’ priority application filing date -- clearly does *not* disclose SEQ ID NO:1 and cannot anticipate Appellants’ claims.

² The GenBank submission history indicates that this sequence was “first seen at NCBI on October 30, 1995,” not October 27, 1995 as indicated by the Office. Appendix A to Appellants’ Reply filed November 17, 2003 and considered March 31, 2005.

In fact, contrary to the Office's assertion, the nucleic acid sequence of AGE-1 was *not* publicly available at the time Appellants' patent application was filed. This point is made clear in Appellants' specification at page 20, lines 1-7, where Appellants state:

The *C. elegans* Genome Project has sequenced cosmid B0334. Analysis of the DNA sequence in the 4 kb region that detected the *age-1(mg55)* breakpoint revealed two putative exons that showed strong sequence identity with the last 88 amino acids of mammalian phosphatidylinositol 3-kinase (PI 3-kinase) p110 catalytic subunit. *The region to the right of B0334 expected to contain the rest of age-1 was not cloned in cosmids or phage by the C. elegans genome project* (emphasis added; citations omitted).

Appellants, and not Swinburne, were the first to obtain the *age-1* nucleic acid and amino acid sequences, as evidenced by Appellants' specification at page 20, lines 7-17.

We isolated genomic phage and cDNA clones extending to the right from B0334 and used anchored polymerase chain reaction (PCR) of reverse transcribed RNA to isolate and determine the sequence of the coding region of *age-1* (Figure 2C). To confirm the splicing pattern of *age-1*, reverse transcription PCR (RT-PCR) was used in conjunction with genomic sequencing of predicted splice junctions. The sequence predicted by cDNA clones and anchored PCR was further confirmed by sequencing genomic fragments corresponding to the predicted coding sequence. Because three independent cDNA clones end within 30 base pairs of each other and because these encode a protein coextensive with mammalian p110 (see below), we concluded that the assembled *age-1* cDNA was likely to be complete. The nucleic acid sequence of the *C. elegans age-1* cDNA is shown in Figure 4.

Indeed, if the *age-1* nucleic acid sequence was publicly available, Appellants would not have gone to the trouble of cloning and sequencing the gene.

It is clear that Swinburne, as of Appellants' priority application filing date, failed to disclose a nucleic acid sequence encoding SEQ ID NO:1, as required by claims 8, 10, and 11. The anticipation rejection in this case has been maintained in error; it should be reversed.

³ Evidence that cosmid B0334.8 encodes AGE-1 is provided by Exhibit C to Appellants' Reply filed November 17, 2003 (and considered March 31, 2005), under the heading "Definition."

II. Swinburne and Johnson, in Combination, Do Not Suggest the Claimed Invention

To establish a *prima facie* case of obviousness under § 103, the Examiner must demonstrate that the differences between the claimed invention and the prior art are such that the subject matter as a whole would have been obvious, at the time the invention was made, to a person having ordinary skill in the art. *See* 35 U.S.C. § 103(a) (Supp. III 1997); *In re Dembiczak*, 175 F.3d 994, 998, 50 U.S.P.Q.2d 1614, 1616 (Fed. Cir. 1999), *abrogated on other grounds by In re Gartside*, 203 F.3d 1305, 53 U.S.P.Q.2d 1769 (Fed. Cir. 2000). Whether or not a claimed invention would have been obvious is a “legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness.” *Id.*

Claims 8, 10-13, 15, 16, 19, and 20 feature compositions requiring the AGE-1 amino acid sequence of SEQ ID NO:1 and methods of identifying modulatory compounds that depend on measurement of AGE-1 gene expression or PI-3 kinase activity. These claims stand rejected under 35 U.S.C. § 103 as obvious over Swinburne (Gene Bank Accession No. Z66519) in view of Johnson et al. (Genetica 91:65-77, 1993) based on the Office’s assertion that:

... it would have been obvious for an artisan of skill to *express the DNA of Swinburne* in a cell and express the protein in a cell, isolate the protein and study its function or practice method of identifying compounds that decrease the expression of Age-1 by following the method of Johnson et al and routine cell culture methods. An artisan of skill would have been motivated to express Age-1 in a cell, isolated Age-1 protein and tested its activity *because Swinburne identified putative functional domain*. Additionally, an artisan would have been motivated to practice the screening methods for identifying compounds that decrease Age-1 activity because Johnson et al teaches that molecular cloning and characterization of Age-1 locus will provide significant insights into the molecular basis of senescence (emphasis added). (Office Action mailed March 31, 2005, page 3, fourth paragraph.)

This rejection should similarly be reversed.

As detailed above, as of Appellants' priority application filing date, Swinburne failed to disclose the amino acid sequence of SEQ ID NO:1. Swinburne, as of that same date, also failed to disclose the nucleic acid sequence encoding SEQ ID NO:1; failed to identify *any* functional domain of AGE-1; and even failed to disclose that the *age-1* gene was present on cosmid B0334. Swinburne therefore does not teach what the Office asserts and does not suggest the invention of any of claims 8, 10-13, 15, 16, 19, or 20.

In addition, the secondary reference, Johnson, fails entirely to remedy the deficiencies of Swinburne. Johnson merely describes the effects of an *age-1* mutation on lifespan and maps *age-1* to somewhere on chromosome II. Johnson does not provide the skilled artisan with the information, requisite motivation, or expectation of success required to obtain a nucleic acid sequence encoding SEQ ID NO:1, to express it in a cell, or to identify any functional domains.

Appellants were the first to genetically map, clone, and sequence *age-1* as evidenced by Appellants' specification. Appellants carried out three-factor mapping, deficiency mapping, physical mapping, breakpoint analysis, and anchored polymerase chain reaction of reverse transcribed RNA to isolate and sequence the *age-1* coding region (pages 19-21, Figures 2A, 2B, 2C). The *age-1* amino acid and nucleic acid sequences first obtained by Appellants are shown in Figures 3 and 4, respectively. Appellants were the first to molecularly characterize mutant alleles of *age-1* (page 20, line 24, to page 21, line 7); were the first to appreciate that *age-1* encodes a phosphatidylinositol 3-kinase (page 21, line 3, to page 22, line 25); and were the first to appreciate that a decrease in AGE-1 activity would directly increase lifespan (page 22, line 26, to page 23, line 23). The references cited by the Office uniformly fail to recognize these key insights, in addition to failing to provide the AGE-1 sequence.

The obviousness rejection in this case has also been maintained in error, and should be reversed.

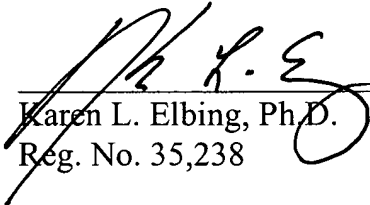
Conclusion

Appellants respectfully request that the rejection of claims 8, 10-13, 15, 16, 19, and 20 be reversed. Enclosed is a check in the amount of the required fee set forth in 37 C.F.R. § 41.20(b)(2) for filing the present Appeal Brief.

If there are any additional charges, or any credits, please apply them to Deposit Account No. 03-2095.

Respectfully submitted,

Date: 29 November 2005



Karen L. Elbing, Ph.D.
Reg. No. 35,238

Clark & Elbing LLP
101 Federal Street
Boston, MA 02110
Telephone: 617-428-0200
Facsimile: 617-428-7045

Claims Appendix

8. A purified and isolated DNA which encodes an AGE-1 polypeptide, said polypeptide comprising the sequence of SEQ ID NO: 1.

10. A vector comprising the purified and isolated AGE-1 DNA of claim 8.

11. A cell comprising the purified and isolated AGE-1 DNA of claim 8.

12. A method of producing a recombinant AGE-1 polypeptide, said method comprising the steps of:

- (a) providing a cell transformed with the DNA of claim 8 encoding an AGE-1 polypeptide, said DNA being expressed in the cell;
- (b) culturing the transformed cell under conditions for expressing the DNA; and
- (c) isolating the recombinant AGE-1 polypeptide.

13. A recombinant AGE-1 polypeptide produced according to the method of claim 12.

15. A method of identifying an AGE-1 modulatory compound that is capable of decreasing the expression of an AGE-1 gene, said method comprising the steps of:

- (a) providing a nematode cell expressing its endogenous AGE-1 DNA,
- (b) contacting said nematode cell with a candidate compound; and
- (c) measuring AGE-1 gene expression in said nematode cell, a decrease in AGE-1 gene expression in said nematode cell following contact with said candidate compound, compared to AGE-1 gene expression in a nematode cell that is not contacted with said candidate compound, identifying said candidate compound as a compound that is capable of decreasing AGE-1 gene expression.

16. A method of identifying an AGE-1 modulatory compound that is capable of decreasing AGE-1 PI 3-kinase activity, said method comprising the steps of:

- (a) providing a cell expressing an AGE-1 polypeptide of claim 8;
- (b) contacting the cell with a candidate compound; and
- (c) measuring the PI 3-kinase activity of said cell, a decrease in AGE-1 PI 3-kinase activity of said cell following contact with the candidate compound, compared to AGE-1 PI 3-kinase activity in a cell that is not contacted with said candidate compound, identifying said candidate compound as a compound that is capable of decreasing AGE-1 PI 3-kinase activity.

19. The method of claim 15 or 16, wherein said method is carried out in a nematode

20. The method of claim 15 or 16, wherein said method involves assaying AGE-1 PI 3-kinase activity *in vitro*.

Evidence Appendix

EXHIBIT A



Sequence Revision History

[PubMed](#)
[Nucleotide](#)
[Protein](#)
[Genome](#)
[Structure](#)
[PMC](#)
[Taxonomy](#)
[OMIM](#)
[Book](#)

[Find](#) (Accessions, GI numbers or Fasta style SeqIds)
[Go](#)

[About Entrez](#)
[Show](#) difference between I and II as

Entrez

Revision history for **Z66519**

Search for Genes
LocusLink provides curated
information for human, fruit
fly, mouse, rat, and
zebrafish

Help | FAQ

Batch Entrez: Upload a
file of GI or accession
numbers to retrieve
protein or nucleotide
sequences

Check sequence
revision history

How to create WWW
links to Entrez

LinkOut

Cubby

Related resources

BLAST

Reference sequence project

LocusLink

Clusters of orthologous groups

Protein reviews on the web

GI	Version	Update Date	Status	I	II
18369669	2	Oct 23 2003 11:29	Live	<input checked="" type="radio"/>	<input type="radio"/>
18369669	2	Sep 25 2003 12:08	Dead	<input type="radio"/>	<input checked="" type="radio"/>
18369669	2	Aug 11 2003 11:26	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Jul 28 2003 9:44	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	May 22 2003 11:12	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Apr 27 2003 11:09	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Jan 14 2003 11:12	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Dec 16 2002 12:32	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Nov 14 2002 11:10	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Nov 8 2002 11:37	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Oct 14 2002 2:55	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Apr 29 2002 11:25	Dead	<input type="radio"/>	<input type="radio"/>
18369669	2	Jan 24 2002 11:07	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Oct 15 2001 11:16	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Sep 20 2001 11:14	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Jun 23 2001 12:07	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Oct 26 2000 12:41	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Jul 21 2000 11:58	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	May 25 2000 4:22	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Jan 27 2000 10:57	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Dec 15 1999 10:13	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Oct 11 1999 10:07	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Sep 6 1999 10:07	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Sep 5 1999 10:32	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Mar 8 1999 4:36	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Nov 24 1998 10:27	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Nov 18 1998 10:36	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Nov 16 1998 6:24	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Nov 13 1998 10:36	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Sep 22 1998 11:12	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Aug 3 1998 10:54	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	Jun 13 1998 3:34	Dead	<input type="radio"/>	<input type="radio"/>

EXHIBIT A

1044812	1	<u>Nov 29 1997 4:36</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Oct 2 1997 2:52</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Sep 16 1997 5:02</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 4 1996 12:16</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Oct 10 1996 3:33</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Sep 28 1996 1:36</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Aug 10 1996 1:27</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Jul 29 1996 12:17</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Jun 8 1996 5:26</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Apr 25 1996 2:52</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Jan 27 1996 1:07</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Dec 2 1995 1:59</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 30 1995 3:35</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 29 1995 2:27</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 25 1995 12:58</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 21 1995 12:44</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 18 1995 12:36</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 13 1995 5:08</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 5 1995 12:33</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Nov 3 1995 1:39</u>	Dead	<input type="radio"/>	<input type="radio"/>
1044812	1	<u>Oct 30 1995 2:27</u>	Dead	<input type="radio"/>	<input type="radio"/>

Accession Z66519 was first seen at NCBI on Oct 30 1995 2:27

[Disclaimer](#) | [Write to the Help Desk](#)
NCBI | NLM | NIH

Search for

1: Z66519[gi:1044812] This record was replaced or removed. See [revision history](#) for details.

LOCUS CEB0334 41812 bp DNA linear INV 27-JUL-1996

LOCUS
DEFINITION *Caenorhabditis elegans* cosmid B0334.

ACCESSION 266519

ACCESSION
VERSION Z66519 GI:1044812

VERSION Z66519 GI:1044812
KEYWORDS Gonadotrophin-releasing hormone receptor like protein; oxalyl-CoA decarboxylase; Phytoene synthase precursor; potassium channel protein; Yeast hypothetical protein L8167.12 like protein.

SOURCE *Caenorhabditis elegans*

ORGANISM Caenorhabditis elegans

Caenorhabditis elegans
Eukaryotae; mitochondrial eukaryotes; Metazoa; Nematoda;
Secernentea; Rhabditia; Rhabditida; Rhabditina; Rhabditoidea;
Rhabditidae; Caenorhabditis.

REFERENCE 1 (bases 1 to 41812)

REFERENCE
AUTHORS Swinburne, J.

AUTHORS
TITLE Direct Submission

TITLE Direct Submission
JOURNAL Submitted (26-OCT-1995) Nematode Sequencing Project, Sanger Centre,
Hinxton, Cambridge CB10 1RQ, England and Department of Genetics,
Washington University, St. Louis, MO 63110, USA. E-mail:
jes@sanger.ac.uk or rw@nematode.wustl.edu

REFERENCE 2 (bases 1 to 41812)

AUTHORS

2 (bases 1 to 41812)
Wilson, R., Ainscough, R., Anderson, K., Baynes, C., Berks, M.,
Bonfield, J., Burton, J., Connell, M., Copsey, T., Cooper, J.,
Coulson, A., Craxton, M., Dear, S., Du, Z., Durbin, R., Favello, A.,
Fulton, L., Gardner, A., Green, P., Hawkins, T., Hillier, L., Jier, M.,
Johnston, L., Jones, M., Kershaw, J., Kirsten, J., Laister, N.,
Latreille, P., Lightning, J., Lloyd, C., McMurray, A., Mortimore, B.,
O'Callaghan, M., Parsons, J., Percy, C., Rifken, L., Roopra, A.,
Saunders, D., Shownkeen, R., Smaldon, N., Smith, A., Sonnhammer, E.,
Staden, R., Sulston, J., Thierry-Mieg, J., Thomas, K., Vaudin, M.,
Vaughan, K., Waterston, R., Watson, A., Weinstock, L.,
Wilkinson-Sproat, J. and Wohldman, P.

TITLE 2.2 Mb of contiguous nucleotide sequence from chromosome III of *C. elegans*

JOURNAL, Nature 368 (6466), 32-38 (1994)

JOURNAL MEDLINE 94150718

MEDLINE
COMMENT

94150718

Current sequence finishing criteria for the C. elegans genome sequencing consortium are that all bases are either sequenced unambiguously on both strands, or on a single strand with both a dye primer and dye terminator reaction, from distinct subclones. Exceptions are indicated by an explicit note.

IMPORTANT: This sequence is NOT necessarily the entire insert of clone B0334. It may be shorter because we only sequence overlapping sections once, or longer because we arrange for a small overlap between neighbouring submissions.

The true left end of clone B0334 is at 1 in this sequence. The true right end of clone B0334 is at 41812 in this sequence. The true right end of clone W02B12 is at 4181 in this sequence. Coding

sequences below are predicted from computer analysis, using the program Genefinder (P. Green, ms in preparation), and other available information.

FEATURES

source

Location/Qualifiers

1..41812

/organism="Caenorhabditis elegans"

/mol_type="unassigned DNA"

/db_xref="taxon:6239"

/chromosome="II"

/clone="B0334"

join(1692..1838,2102..2239,2499..2625,2748..3271)

/codon_start=1

/product="B0334.9"

/protein_id="1044820"

/db_xref="GI:1044820"

/translation="MNLLDYLFNKADILEELGALNNSLLDVPPLMKTFGVIAFFVTST
HVAGQVLYLMDTVTKNIASHTMILYDYIHEGNIPRTFYSAKCKPITCNDETSISCLPE
FQGVGSPTTHNGVVFRTLATDKLCPWFSSMSSPIPSGKVSKEKQHTRTPLRFNCHNE
LRVCGGNAETHEPFEFQLITYAATLPRCTRLCRKVYVQRCGRQYGHGLIMYSYTKPG
LIPRPLNSRLKPPSTTEWFDSSPEIRGDIHLLKRSPISSETVRRRIHKDYGVHLSPKRL
LNLRPQSWPIKDQPLVTEWMMQMIRCRHHRIDSL"

complement(join(4176..4394,4819..4966,5021..5163,
5218..5529,5685..5735))

/note="similar to potassium channel protein; cDNA EST
yk95h12.5 comes from this gene; cDNA EST yk95h12.3 comes
from this gene"

/codon_start=1

/product="B0334.2"

/protein_id="1089818"

/db_xref="GI:1089818"

/translation="MSLETRCRLHLWPSGVRKLLRRIAPQAIIVLILTTMLLVGAAIF
QSIDPVLGEQSFYEVVFFEFITISTIGYGNQYPQTHASRVFSIFFSILGIPLLVTGLG
NFGKYLTKFYWKTHGWIFSERTESELVNDKDMPGIVIACLYLLTFAIGFFFIPHSAAA
YSIDDCYFSFISFATVGFQDKVPQIDTFEKFCKVITYLVWGTILNIMLISYVTNWFQT
LFARQPFRGTDVEVMIGGCITVSEITSLVAKEFHASPHQVRSILHDINGIMEDMKTE
EDSEKSDILVAQDL"

complement(join(6522..6659,7308..7435,7482..7635))

/note="cDNA EST yk121a7.3 comes from this gene"

/codon_start=1

/product="B0334.1"

/protein_id="1044813"

/db_xref="GI:1044813"

/translation="MRQLLLALFVSAASAFPPFIGSVQAVRVTGKVTGNGQPAENIKV
KLYEKEIVLDKLLDEKSTDGRGSFTLAGNKKELTAIDPHVNIYHKCNNGVCYKCLKI
KIPKSFISEGETADRTFDIGELNLAGSFSGESTDCLN"

complement(join(10596..11180,11230..12189,12420..12524,
12857..13062,13799..13814))

/note="similar to oxalyl-CoA decarboxylase; cDNA EST
yk78f11.3 comes from this gene; cDNA EST yk102g1.3 comes
from this gene; cDNA EST yk117b8.3 comes from this gene;
cDNA EST yk102g1.5 comes from this gene; cDNA EST
yk78f11.5 comes from this gene; cDNA EST yk134b10.5 comes
from this gene; cDNA EST yk117b8.5 comes from this gene;
cDNA EST yk27h3.5 comes from this gene; cDNA EST yk171e8.3
comes from this gene; cDNA EST yk171e8.5 comes from this
gene; cDNA EST yk164e9.3 comes from this gene; cDNA EST
yk164e9.5 comes from this gene"

/codon_start=1

/product="B0334.3a"

/protein_id="1044814"

CDS

```
/db_xref="GI:1044814"  
/translation="MSHHVSRVSLLVRRSQFSFAPQRLISVIDKQOQCRQITDYSAK  
DSRINSRKLNRHDGSNMDGASITAAALKSQGVEYMFVGVGFPVIEVGMAAQAHGIKYI  
GCRNEQAAAYAAQAMGYLTGKPVALLVVS GPGILHAIGGLANATVNCWPVVCIGGTAD  
VDLENRGAFQEQESVRNSCKHVS RPTS LH TIPAHIEKAVRCAMYGRPGAVYVDLP  
GNLVLSTEEEEISFPQVPLPAPVSIPPIAEIEKAIDTLKS AKKPLVIVGKGAAWSER  
GATQVQQFLTKSKLPWLATPGGKGVASDLHPRFIGQARSLALREADTVFLIGARFNWI  
LHFGLPFRFQKDVKVQIDICPEEFHQNVKTEVPLLGDIGETLAELT PRLGDWTYDES  
TEWFKKLRENAEKNRAAVEKFVDDHSTPLNYYAAYQPIREFLANNDVIVINEGANTMD  
IGRTMMP SRLPKRRLDAGTFGTMGVGHGFS LAAALWARDHSPKTKVLVVQGDSAFGFS  
AMELETIARYNLPVVTVIINNSGIYRGLLPEDDKAIEGDRTLALPVL SLTAECRYEEM  
CKAFGGAGTVVRTVPEIKA ALEKAFQKTDGPTVINALISTDSERKPKQADHWLTRSKM"  
complement(join(10596..11180,11230..12189,12420..12524,  
12857..13062,13145..13193))  
/note="cDNA EST yk31d2.5 comes from this gene; cDNA EST  
yk31d2.3 comes from this gene"
```

```
/codon_start=1  
/product="B0334.3b"  
/protein_id="1044815"  
/db_xref="GI:1044815"  
/translation="MRFLQKMFQSF CRVFGGRSVSLLVRRSQFSFAPQRLISVIDKQ  
QCRQITDYSAKDSRINSRKLNRHDGSNMDGASITAAALKSQGVEYMFVGVGFPVIEVG  
MAAQAHGIKYIGCRNEQAAAYAAQAMGYLTGKPVALLVVS GPGILHAIGGLANATVNC  
WPVVCIGGTADVDLENRGAFQEQESVRNSCKHVS RPTS LH TIPAHIEKAVRCAMY  
GRPGAVYVDLPGNLVLSTEEEEISFPQVPLPAPVSIPPIAEIEKAIDTLKS AKKPLV  
IVGKGAAWSERGATQVQQFLTKSKLPWLATPGGKGVASDLHPRFIGQARSLALREADT  
VFLIGARFNWILHFGLPFRFQKDVKVQIDICPEEFHQNVKTEVPLLGDIGETLAELT  
PRLGDWTYDESTEWFKKLRENAEKNRAAVEKFVDDHSTPLNYYAAYQPIREFLANNDV  
IVINEGANTMDIGRTMMP SRLPKRRLDAGTFGTMGVGHGFS LAAALWARDHSPKTKVL  
VVQGDSAFGFSAMELETIARYNLPVVTVIINNSGIYRGLLPEDDKAIEGDRTLALPVL  
SLTAECRYEEMCKAFGGAGTVVRTVPEIKA ALEKAFQKTDGPTVINALISTDSERKPKQ  
ADHWLTRSKM"
```

CDS

```
join(16591..16664,16715..16815,16867..17048,17094..17369)  
/note="similar to Yeast hypothetical protein L8167.12  
like; cDNA EST CEMSG11F comes from this gene; cDNA EST  
CEESI49F comes from this gene; cDNA EST CEESI49R comes  
from this gene"
```

```
/codon_start=1  
/product="B0334.4"  
/protein_id="1044816"  
/db_xref="GI:1044816"  
/translation="MKLWDS PNTSFPYSFDEVASAFWD RYPNSHAKHIISEDVLERQI  
TDNTIVTKKLIVKQGS SILKRVPRWISRMTDIQVVPVIEESVYDKVSKKLVITYTRNVS  
HISLFQLHERCIYKSS EDNQHH PALLDVLR SVTVS IDCGRMSSVYEKVL LMGFKKS  
INNTTKGLFEKLEERFGVKNVAN EKM KI KEKIIKSSSNLVTHVQCEEDV"
```

CDS

```
join(18553..18884,18952..19114,19164..19427,19857..20360)  
/note="similar to phytoene synthase precursor"
```

```
/codon_start=1  
/product="B0334.5"  
/protein_id="1044817"  
/db_xref="GI:1044817"  
/translation="MRRSTQLSIIHHIRQPCQSNVPRICDAPNLETTATSTTKLFSWN  
SQWTC LRSY SNGRR LGRFSGITSISARHFSTKSSPFLDTSSNNNISNDKKKTPSRSP  
DFSNI PGARIPKSM PKRTRFLEISKQQADEAFRSCLEMVRKH DIDSYLA ILTINKRAQ  
PEIVALNALNVELASIRDKVDTRKGDASAMYRLQFWKDAISSIYGISPLPVPRQPVAI  
ALCSFAAGANS DMLLKL VETRQSTIGDRQFSDINALCEYGKSTIGSLLCLQIDALARN  
SPETKVLPMAYDVAKDLGAAYAIANMIRATHPLLARGIVLLPADVMSLNGATPDSLYK  
KKKLD EVMGMTKDLVNESKRLLIDARSPIEMVPKAVRPALAAATGATTDYIIKTIEKN  
YDIYSPHLQRRNPLLLWSLLVRKLC SKY"  
join(31563..31968,32014..32087,33645..34083,34488..34591)
```

CDS

/note="similar to Gonadotropin-releasing hormone receptor like protein"
 /codon_start=1
 /product="B0334.6"
 /protein_id="1044818"
 /db_xref="GI:1044818"
 /translation="MDELITLEGASQSEQIIGSHDFCNFSNITHHEHDEQSIIVVWS
 NVAVLPVIALIGLACNLLNMAVLTSNKTARRIPSWNLLIALAVCDLSFLIFATLDVTP
 LSIPSLAFSTSFNFHFSRIVLYIRTLASTFYKSSRNIPKSKFLANCQILEKIRHVYRH
 IYYRTMDYVSLFAFNVLPPIIGLLYMNSRIIFTLRRVDEDSRKYEETKLSDGLIQHDA
 HNNRTMRANAMLFVAVFMLFFCVGPQAPARILFDMYGQYHPKAILYVCLSQQLVFLNA
 SLNFCLYCVVSKRYRTLKQTLKKELHKLKLEGVDPHFQINLKQTKSSSAHVTSLEDHHA
 HLIQNV"

CDS

join(36840..36939,37888..38078,38131..38355,39373..39747)
 /codon_start=1
 /product="B0334.7"
 /protein_id="1044819"
 /db_xref="GI:1044819"
 /translation="MFFPVLVGISAGVLSWFSVPVWVQVFCQQLGLGLATAIVMLFE
 NRHNTLVRGRFKIEANWIRYTFYAVNGIYALLFLLPVYFRIPDPEWAKLILLKILPCP
 HPSYFQSNVVFVSMDISVGTAGIFLLFLLTEVFLVLCIHSSYFLMSLKTHMSPTTRK
 LQQKFFIDMIFQTMTHSVVVRENVKSEYRIVLRNTSIYDVAVKIVNPNESPKLERYEC
 LVLSNKYTEVAILETPSKAALLRNKPVEIYARAIYPYNRNKIRHWIEGHVSDKPHHLV
 QSLNFVADNAEYSAKTVMKKV"

CDS

complement(join(40596..40727,41436..41534))
 /note="cDNA EST CEMSC28F comes from this gene"
 /codon_start=1
 /product="B0334.8"
 /protein_id="1167775"
 /db_xref="GI:1167775"
 /translation="MWNNRDLFVSLFTLMLGMELPELSTKADLDHLKKTLCFCNGESKE
 EARKFFAGIYEEAFNGSWSTKTNWLFHAVKHV"

BASE COUNT 13058 a 7729 c 7485 g 13540 t
 ORIGIN

```

1 gatcctctcg cgaagaccat tgggctcgag tgggctcttc gctcgtcata ctgattgaga
61 aatggcgatg tggagaatgt caagcttatg tggacttttt ttcgagaaaa aaaataacgt
121 ggaatatatt ttttgtttga taaatttcac acacgttttt ggtcacaaaa ctttggtgag
181 attttttttg cgtgaatttg aaaatttcga tttattattt tgagagaaaa gtaaattttg
241 gcaactttca ggcaatatcc agaaatatcc taacggatta ttttttggtg gtagtgaaat
301 caacttgcaa caaacttggc aacttaccga aacagttgaa acattgccag aaaaaggcac
361 tatcacactt ttggaaaatg gaataataag tttgttttag ttttcaaaga ttgctagtat
421 aattaaagca tctgagagac cgaaaagaga actgcagagc ttgcaaagtt gcgcaaaatc
481 tgaaaagaaa ttggttaaact ttggtagaaa ttacaaaaa tttgataaca agttggtaaa
541 catttgccag taaattgact ttacagtact cgtgccacac tttcattgga tgtcacctat
601 gaattaagat caattgatat tattaatttg ttgataaaa gaaaatgcat tttttgaata
661 ttgttaaaac atatgcaaat gtaaatatac aagttcaaaa cataatgaac ataacatatt
721 gaacagaaaa aatactataa gagagaatac tattcgctct tggagctcaa agtcttgtaa
781 aatggaacaa gattgtttaa aatgcgattt gacccttcg tttcgtagta gacaaaactc
841 tccttgaggt tcttgagaga aagcttgaga ttggaaaagt actttgagca tctgaaaata
901 taaaaaaatt taaataaact aatcactgaa ttgaagaata caatagttac tacaggtttc
961 cttttacaca attttatcat tgctactctt gaaaactttg aagcggctga ctttttggtg
1021 attcttggtt gactatttaa attctcggat aatttttttt cttatcaaac cgatcaagtt
1081 tggttcagcat tatgatatta tcaaaaaata caaaatttaa aaaaatgtat ttttgatcta
1141 ccttggtgac tagactcttt cccttccttc gacgagacag ccaccgcaaa aataacaacg
1201 tagttccaaa ggtagatcac aaattaatta tggtcacaaa ttaattaatt aattaattat
1261 aagagctcaa catggatgga gagctgaagc tcgtcaaaca atggatcaat tgctcctgaa
1321 tatcttttga cggagtatag tgccaaattg cctcgggagt caagactgaa gaaaaaggta
1381 gattacctga agatctttca acacatcatt gattgtttat ctagattttc tacgtcactc
1441 gtcacaatga aatggtcgga aatgtgctaa ttcatttgga cttcgtaacc caggaaatgc
1501 tccggttctt gtatatactc tccacggaaa taatcgctctg cgaagcgctg ttacagatga

```

1561 gcagtggtgga gttgacaggt ttgtaattat atattcgaga accttctctc taatttgtat
1621 ttcttccggt tgagccgaaa ctcatatacc tgaagttgcg ttatatcaac gtgggttggg
1681 ctcgaaacaa gatgaatttg ctcgattatt tattcaacaa agctgatatt ttggaggaaac
1741 ttggcgctct gaacaacagc ctcttgatg taccaccgtt aatgaagact ttggaggtta
1801 tcgcattctt cgtcacttct actcatgttg cgggacaggt ctaccacgct attgatggtc
1861 tttccccgtg aacaacaaaa tgaaggaccg aaaagaatct acattcgac agaaagagta
1921 tgcttcacac tagacgagga taacgataac ttcataatgt cggatggatc ggaatatatg
1981 ttgatagaga gaatttcaac acttgcacga tgcaagaaag tgagaaaaaa ggtgagtgga
2041 cgaatagtga aaatttgaat taacaatttt tggatacaca gataagaaat gtggtttata
2101 ggtgtgtgac ctcatggata cagtgcacaa gaacatcgcc agtcatacaa tgatactgta
2161 tgactacatt cacgaaggga acattccacg aaccttctac tctgcgaagt gcaagccgat
2221 cacgtgcaat gatgaaaccg tatgttggtt acgtaacaaa atcatgacat caaaaaatga
2281 aaattacaga atccgcataa cttgacgaaa gttgataaga cggagaaatg tccattcctc
2341 ttgccgacca aaactgcac tggcggtact ttttcttg cacttgctga ttccggcattt
2401 cggagcgaca acaatcgtca tattgagtat ctggtcaatt gaagcgatct gctgttagtt
2461 aactatcaga aagaaaaaat caatatcttc ttttccagag tatatcgtgc ttgcctgaat
2521 tccaaggtgt cggatctccc accaccacac acggagtgtt ctttcgaaca ctggcgacag
2581 ataagctgtg cccttggttt agtatgatga gttcgctat accttgtag ttttatggtt
2641 acagcgttta cactagtctg cgactctaaa tgtttttc aaattgacgc acttagtgtt
2701 atctaattaa acttggttag aaattccctg caaattctaa tttgcagcag gaaaagttag
2761 caaaaaggaa aaacaacata caagaactcc tctccgttcc aactgtcaca acgagctacg
2821 agtctgcgga ggaaatgcag aaactcacga accatttgag tttcaactca taacctatg
2881 ggcaacattg cctcgatgta ctgcgcttgc cagaaaggtc gtatatgtgc agcgatgtgg
2941 tcgtcaatat ggacatggac tcatcatgta cagctacaca aagcccggat taattccccg
3001 gccactgaac tctcgattaa aaccttcaac tacggaatgg tttgacagtt tctcaccgga
3061 aatccgagga gacataattc acttgctgaa aagaagtcca atcagtgaga ctgtaagaag
3121 gattcataaa gattacgggg ttcatctcag tccgaagcga ctgttgaatc tgagacctca
3181 aagttggccg attaaagacc aaccacttgt caccgaatgg atgatgcaga tgattcgttg
3241 ccgacatcat cggataattg atagtttatg attttttgct tataacttat gatctcaaat
3301 tgtgcaatat tttgaatttc atttatctcc atttttcaat ttttgaata cgtgtttgat
3361 aggttatagg tgtttgataa gtaaatgatt taaaagtaac aggttttgca aaaaaatgga
3421 aattccgcgc acgattgctc gtattttatg gatttttggc aaaatgggga aaagtcccaa
3481 gttcatcaaa atttgactga ttgattttat tccagataat caatctaccg gtttgtgaat
3541 tcacagaata aataagttca caacattggt tttcacaatt cataaatggc aacatttatt
3601 tttagtagaa aacaggttta ggcgtttttt tttgctcttc aacactcaat tgttgcttcg
3661 gttcacgctt cttgccattt tctgcttatt tttctgcata ttcattggcg tttcaaaaatt
3721 cctaaatctg aaattcccta aaaaatccga aaactggtgt tttatattca caaagattta
3781 ttcataggca atttcctgaa ctacgtttac atacatgtgg aaccactctt acgtgcctac
3841 attatacctc agccatacct gctagtctca acaccgggac tgcctaactc atgtgtcta
3901 actcatgtct ggataccttg tgcctacctc gcgctactt tccctgtaca tgcctacggt
3961 tctgctgttc ccaccacatg tctgcctacg gaaatgggag cttcaagtgg tgcaccaagt
4021 ttgaatacca ggctgtgctg actaacaac tttgagatga cttcaagtgg tgcaccaagt
4081 ttctgtaatt ttatttttta aaaaacaccg gcatctttat taattttcca caggcaagtt
4141 cagctatttc acataaatac aatgttaatc aataattaaa gatcctgagc aacaaaaata
4201 tcagatttct ctgaatcctc ttcggtcttc atatcctcca taataccatt gatgtcgtga
4261 agaatcgaac ggacttgatg aggtgatgag tggaaatcct tggcaacaag agaagtgatc
4321 tctgatacag taatacattg tctccgatc attacttcaa cgtcggttcc acggaatggt
4381 tgacggcgga agagctggaa gtggatatga aaaaattttt tttgcagttc aattgtttgc
4441 gtttaaacat tctaggattc gaaccaaggg gtgtgcggca aatctcaaaa ttgcccagc
4501 tcggcaaat cggcaaatct ttttcaata tttgccgagg acggcaaat ttgcaaat
4561 ggccaactcg gcaaatggcc aattcggaac atttggaac tttgccgcac acccttgatt
4621 ggagcctgca tcaatactct aaagtctca taataaccac attttgaaaa ttgcaaat
4681 tgcaaaaatt tggaaatcga gaaagaaacg attgacatac gattgacgat taacatgaca
4741 tacatgtgtt ctcatttaaa taattgtcac tgcttttcat gaaagtattg gagatataca
4801 attccaacaa aagaatacct gagtaaacca attagtcaca taactaatca gcataatatt
4861 taaaatcggt cccacacaca aataggtaat cactttacag aacttttcaa atgtatcgat
4921 ttgaggcact ttgtctccga aaccaactgt tgcaaaactg atgaagctga aattttttt
4981 aatttaaaaa ccataatact ctgaatatat ctatataaac ctgaaatagc agtcatcaat
5041 ggaatacgca gctcccagat gtggaataaa gaagaagcca attgcaaatg ttagaaggta
5101 gaggcaggcg attacgatac ctggcatatc cttgtcattt actagttcgc tttcggttct

5161 ttcctaaaaa gagggtccat tgaggagttg ccaagttaat aagaaaatct aactgaccga
5221 gaaaatccaa ccatgagttt tccagtagaa tttgtcaaa tttttccaa aatttccaag
5281 ggtcactaca agaagaggaa tccccaaaat tgagaagaat attgagaaaa ctctggaagc
5341 atgagttctga ggatactgat ttccgtagcc tattgttgaa attgtgatga actcgaagaa
5401 cacaacttca tagaaggatt gctctccgag caccggatca atgctttgaa aaattgcagc
5461 tccaaccaac attaatgtag tgagaatcaa gacgattatg gcttgtggag cgattcgccg
5521 gaggagtttc tgaattataa ttgcctgaca ttgtgagaaa aatttaaaaa gaatctcaga
5581 cggggaaagt taatcttcac aataactcag tagcagaact ggatatcaca tcaccgattc
5641 ctctgtcgag aattgaactc gcagcggttg agtggcgggc gcacgcgcac accactcggc
5701 cacaatgca gtcggcagcg tgtctctaaa gacatataaa aagcgcgtat agtgtagtaa
5761 tggtacaaaa tgggttgcaa ctttgaggat tactgtagtt ttcaactact cgttttttgc
5821 aaagttttca ttgatttttt tatagttttc gttccgtttt tcattaaaaa cagtttttca
5881 acaaaacacg taaggaaaaac tattaaaaat aaatgaaaat ttggcaaaaa agagtagttg
5941 gaaattacag taatcctcaa aggcgcacat ctttttgcat ttttgcaaaa tcattttcct
6001 gtcgagacct ggtaccgtat ttttaggaaa aactcgcaaa ctttcttgag gtttccgaaa
6061 aataaattaa tgcactttac ctcaagactg ctcttctgct tcattttgat gaaaaatcga
6121 gacaaaaata gtggaaaaaca gctgtgaaaa accggaaaat actgtgccag atgtcgtcgg
6181 gcaggtcact tcaaaaacgg aaaattgtaa aaaaaatcga tgagtgtatg aaaaagaaga
6241 gagagctaaa gaagaggtgt aaaaacaaac tggcccgctt ttgtcagtag acgaaaaagt
6301 attcaaagtg ccccatgaat ttacgacact cgttatagca accaaatgtc tgcgcgtacc
6361 gctctttttt tgtatatcac tcgagaagaa gaaggaaaag agacaaaact gtgttttagt
6421 tgggggaaaa aagaatgtga aaaatgagaa atgtgtcgac aaattgattt gatgtttagt
6481 ttcagtgaga gaaaacgaac aaaaaaaaat ataagaagga tctagttgag gcaatcggtg
6541 gattctccgg agaattgatcc ggccaaattg agctctccga tatcgaatgt tctatcgga
6601 gtctctccct cgctgatgaa gctcttttga atcttgatct tcagcttctt gtagcaaaacc
6661 ttaaaatata aacgattatc gaattgttga ggagaacgaa gtgagaatcc tagacagtga
6721 aaaaccctat tgtctatttc tagcgccaca ttccgatca atccatcata tgtttataaa
6781 tgatgtcact tttcaaattg aactgtttcg ttgcaaaaagt tacataaaaa ctctagcaa
6841 ttcagggtttt cttctgagat agcggtagtt aaagttttt gctataggat gatgacgtca
6901 cggtcttcca gcaatccgct agttggaaaa aaaatgttt taatcttgt tagaaagttt
6961 taatattctg aaataccaga aaatacaaat ttaatatat cgaaagactg aacaaatcta
7021 gcttttttaa atataccagt tctctttttt agagggaatt caaacatgga aattcgcaat
7081 gttacaaatt agacttttta atcttgctcg attttttcat attcgtattt ggttttctga
7141 acttacaata tcgagaatgt taaagctaaa actcaattca cgctactttg cctgaatcaa
7201 aattggaaaa taaaactgtt ctagactaca actgttctag gaatggcgaa atttccaaaa
7261 gtagctcact ctctacataa aaaagtcaat taaatgtata ttcttaccct attatagtta
7321 cacttggtgt agatgttaac atgtgggtcg atggctgtta gctctttctt gtttccggca
7381 agtgtgaaag atcctctacc gtcagttgac ttctcgtcga ggagcttgtc aagaactgaa
7441 acatgtttaa cttctgggtg ccgagcagtc aaaaacctta ccaatttctt tctcgtagag
7501 cttcacttta atattctcag ctggttgtcc attacaggtg acctttccag ttacacgaac
7561 agcttgaacg gacccaataa atggaaaagc ggaggcagcg gatacaaaata aggcgagaag
7621 cagaagttga cgcattctga atttttatgg aattatgggt gtaattgagg tatttataat
7681 aataatttta taataacgaa aatataattc taaagataga gaggaagtga tgtattatta
7741 ggggaatttc aatgagtcac accccaatc gtaccaagtg atgtgaatga aaaaagaaaa
7801 aaaagatggt gaagcagttg aattcagttg tttctttctt cttctactag tcggtaccca
7861 cccacttcat ctaaaacaatt gggccttttt gatataaaaa ctaacagggg aatagtgtaa
7921 aaatcacgga gacgcagaga aatatctagt tacactgtgt tgtttttggc aaggtcagta
7981 agtgtttcat ggtcagtttt ttggcgatcg ggaagtcaaa tcgttttgat aatacttgga
8041 attgatagtc ttccgaaaag attacgaaaa aaaaacaaaa cgtttcggat atgggggttac
8101 gtggcgaaat ggttgaggac actaaacaat tatccagatc tagtttgctg taattgatgg
8161 gcaattattg gacagagagg tcggaaggtt gaaataatca aaatatgaat gtttaactat
8221 aaacaagtaa agtcacgaaa acgtgtgaca gacggcaata ctaaaccttc attttcacat
8281 aaataagcaa acgtagtgtt aattttgaat ttaaatttat ttcactttag aaacaatgga
8341 aaaaaaacca acatacatag aataatgtaa ctaaagaaat tgaaatctgc ctattttgca
8401 tataaatggt cgttttggtt aattaataaa atacgcactg aaaggcatga ctgacagtgt
8461 atgttttctg ttactacttg aagcttttgg cagcaactgg gaattcggtt atatattctg
8521 aaagagctaa aaatttgcaa caatgcttct gaaagaaatc tcaaaaataag ttactttgaa
8581 gtaagttagg agttttaaag ttttgaaact ctgcctattt tgcctataaa tggacgttta
8641 attcatttat aaagtatgca ctaaaaggta tcaactgagag tgtatgtttt ctgtaactac
8701 ttgaagattt tgattgcaac tggaaagttg ttaatgtttt ctgacagagc taaaaatttg

8761 caacaattttt tctgaaagaa atctttaaaa aagttacatt gaagtaagtt aggaa ttttc
8821 aaagttctga aaatctacct attttgcgtt acaaatttac tgattcatgt ctgaa caata
8881 atgtaatcat atgtgtctag tacatatagt tcggtacatc ttctaatact tttatcttgc
8941 taaggcactt tttgtttttt gtttaatat atgaattttt agtactctcg ataaaacggta
9001 caagatcctt ttgttccagt ataacaatct ttttcaaaac ttaaacgctc taatgaagat
9061 atgttcatta tgattgtaaa gtctaagatt gttatctcgt gcgcctatta cagcgagaat
9121 caaaaccogg tatttgaagt ttacacatct cttctcaggg tacataacca gctt tttgca
9181 tcttcttttt ctgatttttc ttcattaaat ctcaaatac tcgagatgag gtcgtttgta
9241 cctttgattc tattcgcatt atttattggg tgcttcactc aacatggagg aatcgctaga
9301 atgcaggaaat tgaagacaaa agtagatcca ataagaagct tcgatcttcc ggat gaagct
9361 ccgagagcaa gaattattgc aacggatttc ttgacaagag gcaatagaaa aatgaaaaag
9421 ccatttaagg taagattttg atattttgaa aaacactact acgcttatat ctctgttctc
9481 tttgatttta tcaaaattac gtcaactgac aaaatacgt aaaaagtattt atctacattt
9541 ttgtaatgaa ccatttttcg aacaaactga agagaaccga gatataagcc gtcaaaagtag
9601 aagtagatcc attggtgttc aagtttcagc attcgggtatt ttttgaaatg caaaatatcg
9661 catacttaag ctttctttta gttttgtgaa ctgggaaatc gcacgctctg tttggctgct
9721 ataatttgaa aattgacggg cgtgtcgaga ccggctaccg tatcattgctg ttatacattt
9781 tttttcaaaa tcagattatt caattccttt gttctctaaa ttaattaact ggtcattacc
9841 cagttgtcag aactttttaga ggtttttgac acaaaaatta tgttcccggt ctccggcacga
9901 acgaaacttt gcagctaccg taaccacgag tattttgcac tcttctctct tatataagct
9961 tcgctcaatt ttttctattt ataatgcaaa aacttcaatt ttttgaaaag tgttttaaa
10021 aattcatgtg aaagaaatac agaaaaaatc gctgaaaaaa gtgctgcctg tggttactgt
10081 agcagcaaaag tttctgtcgc tctagcaaga cctgggtcag tatgtatttg tgccttaaaa
10141 attacaaaat tttggaaact ggataatacg acactctaatt attatgtggc aatcagacag
10201 taaccaacaa ttttaaggta ttgacgctc tctgaaaatt gaattttcag gacgattccc
10261 gccaagaaga cttcaggaga tgggaagctcg acgagctcac agatcgagat atgagaagca
10321 gtaaagaagt gaaaagttct gttcagatcg cattcacaaa ggatagtggg agtgaagaag
10381 atgagcatgt tggagatttc ttcccatcca aaagagttta attttgtaa ctcagaattt
10441 aattttgtaa ctttgaatta attatgtgta aatatatgtt ctaaaataaa acactcaggg
10501 actagggttt attcaaatgt gatcacagtt taaaaatac aaatcaagga aataattaat
10561 ggtaaatgca gtgaaatata caatttgaga cttatttaca ttttcgagcg agtcaaccaa
10621 tgatcagctt gtggttttct ctccgaatct gttgagatga gagcattgat aacagttggt
10681 ccgctcggttt tttggaatgc cttctcgaga gctgccttga tttctggaac agtttctaaca
10741 acagttccag ctctccgaa agctttgcac atttcttcat aacgacattc agcagttagc
10801 gagagaactg gaagagcaag agtacggctc ctttcgattg ccttatcatc ttctggcagg
10861 agtccacgat agattccaga gttgttaatg ataacagtga cgactggaag attgtatcga
10921 gcaattgtct cgagttccat ggcagagaat ccgaaagcac tgtctccttg aaccaacgaga
10981 accttagtct tcggactgtg atctcttgcc cagagtgcgg cggcgaggga gaatccatga
11041 ccgactccca ttgttccaaa gggtccggcg tcgagggcac gcttcgggag acgggaaggc
11101 atcatggttc ggccgatatc cattgtgttg gtccttctgt tgatcacaat gacgtcattg
11161 ttggcgagga attcacgaat ctgaaaattc gaatttgaat tatatatatt tattcaaaat
11221 tccacttact ggttgatatg ctgcttagta attcagtga gttgagtga catcgacaaa
11281 cttctcaact gcggctctat tcttctcagc gttctccctg agcttcttga accactcggt
11341 tgactcgtcg taggtccagt cccaagtct tgggtgtcaac tcggccagcg tctctccaat
11401 atctcccaaa agtggaaacct cagtcttcac gttctgatgg aactcttctg gacaaatgtc
11461 gatctgaaca accttcacat ctttttgaa tcttggtgga agtccgaaat gaagaatcca
11521 gttgaatcgg gctccgatca ggaatacggg atcagcctct ctcaatgcca aggatcttgc
11581 ttgtccgatg aatcttgggt gaagatctga agcaactcct tttccacctg gagttgcgag
11641 ccatggaagc ttggatttgg tgaggaactg ctgaacttgt gtagctccac gctcggacca
11701 cgcggtccc tttccaacaa taaccagagg tttctttgag ctcttcaagg tgtcaatagc
11761 tttttcaatt tcagcaattg gtggaatgga aactggagct ggaagtggga cttgtggtgg
11821 gaagctgatt tcttcttcag tgcttggtta cacaagattt ccgggaagat caacataaac
11881 agtccaggt cttccgtaca tcgcacatct cactgccttc tcaatatgag caggaattgt
11941 gtgaagactt gtcggacggc taacatgttt gcatgagttt ctgacagact cttgttggct
12001 ccattcctgg aatgctccac gattctcgag atcgacatcg gcggttctc caatacagac
12061 tacaggccag cagttgactg tggcggtggc aagtcctcca atagcgtgaa ggattccggg
12121 tccagagact acaagaagag caactggctt tccgggtgaga tatcccatag cttgagcagc
12181 ataggcgggc tagacaggta tttgttttta aaggaaattt atattttatt tcaatgagac
12241 cgaaaagggt ggaaattcag aaatatcacc aaaaaaactt tctgaaaacg gtatttttca
12301 attattagtt gggtttttca tttttcaacg aatatttttt gttttctttt gtgatatttc

12361 tgaatttcca acgttttcgg gcattttcga attccccgcg tcttccaaaa ttcacgaacc
12421 gcttgctcat ttctacatcc gatgtatttg attccatgtg cttgtgctgc cattcctact
12481 tcaataaccg ggaatccgac gactccgaac atgtactoga caccctgaaa tctatttttt
12541 ttgcttattc tgtaagtatt tcttgctatc aataatcact gataagagtg aattatggtc
12601 ttattttctga taatctatga gctggaggtga aagtcgacaa tttttcggga aaaattgcca
12661 cgtggagggt atcagtgaag tttttgtaaa agttataaaa agtaaactac atttgagaaa
12721 aattaatttt agagcaaaat ttttaacattt ttgcaaaaaa gttttttttg tctggaaaaa
12781 ccatccaaaa tccctttttca gaaaaactcc attttttaaa caaattaatt tttttgattt
12841 tttaaaatga acaaacctga gatttaaggg ccgcccgtgt aatcgatgca ccatccatat
12901 ttgatccgtc gtgattccgt agttttctcg aattgatgcg actgtctttg gccgaatagt
12961 cggatgatctg ccggcattgt tgcttatcga tcacactgat aagaccacgt tgtggtgcga
13021 aagagaattg cgaccttcgc accagtagag acactgatct acctgtgaaa gatattttta
13081 ttagagagtt tcgtagtttt ggaagctttt atttagatga attgaaattt tgattccaga
13141 aaaccccaaa aaactctgca aaaagactga aacatttttt ggagaaatct catttttggg
13201 ttactgattc aaaattgaaa cacttttcta tgttttttcg gtcgaaattt tgaataaata
13261 tattcgggta gatatttttt ataatttgag tttaaaaaat aagaaaaatt tctggtttggg
13321 ttactgtaca ttttagattt taattatttt ttcgctcccg agaattattc cgaattattg
13381 aacaaaaatt cttaatttaa aattcgtgac tgggtaatat aacctagacg cgaatttttg
13441 cgattttcgt gacaactttt tgtaaaatac aagagggtgt gcacgcatgc gccttttaag
13501 agtactgtaa tttcaaattt ttgtttaaaa tttctgctga ctttctatct acttttataa
13561 tattttcgtat aataagaaat ataactttat cggaaaaactg agaagaactg tgcaaaattg
13621 atgaaaattt taaaattcgg gagaaacgaa attttaatac tacagtactc tttaaagacg
13681 cacatctctt tgcatttagc agaaatttgt cgtgtcgaga ccggatacag taactttgaa
13741 gcaatgctag caagacttcg caaaattcca gaaaatattg tttaatgcaa taatttactc
13801 acgtgatgtg acattggcaa gagaagaagc tataaaccgt gtggatgaca tctgtaaaac
13861 tttttcgttc tgattgaatg aaaaagcgga agcaaagaag tcaataaaac aaggttctga
13921 tttgaatgat ctctgtgact cgtttctttt actgtctgcg tctatgtatt caacgaattc
13981 agtgcaattc aacagcaaaag attacaatga tgactattat tttttgaga aaaccttctt
14041 cgtgagacgt catcagattc ataaaggctc cggaaatagc ttgatgagta aacatttgat
14101 ctcaagttca aagaactatt aattttgaaa ccggagatga ttcattgaca aggaaagcaa
14161 caaaaaaaac taccagtaaa gtgtaattca aggaagaggt aataggcaag atctacagga
14221 aaagaatgga aaattagtaa aagtgttttc tagatatgaa ctaaaaatgt acaaaaaaga
14281 gggaaaaata ttgattgtac aaacaaaaaa agagataaca aattgaacgg gttgggttga
14341 ccttcgagtc attagaagct tgattctgat aagggtgttg agtcgatttt tgcaggagat
14401 tctgaaattt aaaagtaaag ctttttaata agtttatatt gttttacaca aaaatcaata
14461 aaggacgaag cgggtgaacat tttagttttc tagtttttta gatgttaatt tatgattttt
14521 aaatttgaat ttttcgcaga atttatgtta tgggcaactg gaatccatct gaatttctg
14581 ctcaaaacat taccgttaac tttctcctca tctcatctt cactcgattc tccgagtaag
14641 ctcatatcgt cttctagcga cgattccacc ggagctgagt cttcttccat cttcatcgac
14701 tctctctctt cgttgctcgt ctttttctcg ttcccatatt cgcttccact cagcagctct
14761 tctcgctccg atgttgata acttatcatt tccgggtctga aataatattc gttatttcac
14821 acaatttaac aggaaaaaca ccgcaatcat actttttatt tcttgccgtg tctccatcca
14881 tcatctcttt tgctgttata agcagttggg gagctggctg ctgtggaggt tctccatcca
14941 gccaaaccgc gattttttcca atactggaac tacagaagtt ggttcataac taaagaatgg
15001 ttttgattat taactattaa attaaaaatt cttacaaaac atcacgattt gagctatcaa
15061 agttcgaata gctccaagca ttagaacaag gaagattgtc agcttttttt atgaattcgt
15121 tggagcaccg tcatatagat ttctggaaaa attaatattc agcttttttt atgaattcgt
15181 caaaaaatac ctgaagaata aattaaagtg cttcgcagaa ccagaaaaaa acgcaaagaa
15241 tcttccggaa atagtctcag aaacacttc gatgatagaa atctcgtgga aaatcgatat
15301 ggtttgactc tgaaattttac aacattttaaa ataatttaac ccaacaaaga agaaataaaa
15361 caaaaaactaa cctcaatgta ctttaaacat tttgattttt gccgatattg gaaaggcgat
15421 gcgaggattt caaccattct tgagagtaat cttctgttag cacaagaatc atgagcatgc
15481 tcttggaatt gtgcaaatct tctgtattct gcttcttgat attttttgct ataaccagaa
15541 tacatggaaa caagaagagc agttgagaga acgagaatcc aaaagtttcg tggccgaacg
15601 attgatcgaa gaacaacaaa agcagccgcg ggcaaaatga agatgttcag tgtgaaaatg
15661 aaaggttgga gagtcaaaa tgtatcctgc caagtacgat ctggagctgg aggcttcacg
15721 ctgaaaatgt ttgacaacgc ggatcggacg gcttctctct cttcagccaa atctgcttca
15781 tcatttttta aatacttcga aagaaccgac atgctgtgcc gagatatttt aattctgcaa
15841 ttcaaagctt aaaatatatc ggaactagaa gaaaatatac tactgtaca tcttttttaa
15901 ttgaaccttc caaatgatag tcaatttttg tttcgtggag aagttgtcga agaatacagc

15961 gaagacttt g atcaggctga aactattgaa tgggttattt acggatttct ttaaagcttt
16021 tagttttacc t tctgaacttg atttcgaaca gatagaagtc gttttgacgc tggcgggctt
16081 tctccagaa g ttggatcatt cggatctttc cacacatttt catgtgtaaa ttcttcgtca
16141 atgtcttga g ttgcgaaaag ttgcgggacg aggagtagaa gtgtgaccca tattattttc
16201 atctgaaa ca agcggaaagt tgaaagagaa aagatgttta cagcacgctc agcaactgac
16261 aggcgagtt c ataagataac atagttgttt gatcaataaa atgttgtgtt tttccgagtt
16321 ttcagataa t tgcgatttaa acttcacttt ttatattcag aaaattgtaa aatcgaaaca
16381 tttcaagaat tgcgaaacaa gttttcagaa ggcaaattaa taagtataat acggttgaca
16441 attggtgtat gcagaattgt cgtgaatttc gatgcctgcg tacgcgagaa atttgcattc
16501 attattttct tttccacagt tttccacact tttctcatcg atttttgcaa taatttcac
16561 aaattttct t gtttttcagt aaacttcaag atgaagcttt gggattctcc gaatacctcg
16621 ttcctttat t catttgatga ggttgccagt gcgttttggg acaggtgagg caggaaatct
16681 cggaaaatg taatttcaat ttctaaaccc tcagataccc aaatttcat gcaaaaacaca
16741 tcatttcgga ggatgtactc gaacgccaga tcaactgacaa cactattgtc actaaaaaat
16801 tgattgtcaa gcaaggattt tagctgatat tacaagagcc agtaaattat tgcataaatt
16861 tttcaggaag ctcgattttg aaacgtgttc ctcgttggat ttcgagaatg acagataattc
16921 aagttgttcc tgtcattgaa gaaagtgttt atgataaagt atcgaaaaaa ctcgtaacat
16981 acactcgaaa tgtttcacac atttctctat ttcaactcca tgaacgatgc atttacaat
17041 catccgaggt ttatcattgt tatttcaaat ctctatttac tgtattttt caggataatc
17101 agcagcatca cccagccctt ctcactgacg tactgcgaag tgtcacagtt tcaatcgatt
17161 gtggtcgaat gagctcagtt tacgagaaag tccactaat gggcttcaaa aatcgatca
17221 ataacacaac gaaagggttg tttgagaagc tagaagagcg atttgagtc aaaaaagttg
17281 ctaatgagaa aatgaaaatg atcaaggaaa agattatcaa gtcacgtca aatctcgta
17341 ctcatgtcca atgcgaagag gatgtctagt cagccatact gaataataat ctcaaacatt
17401 cactttttcc cgttattttc atttatgtcc ccccaaaaaa atctcaattc tcatagaatt
17461 actgaatctt ctgcacattc tttgcattga actgagacca ttatttgttt gttatttggc
17521 tctcaatctc tcctgataaa tgtacatatt caatttattt tttgaatttt ttttgctat
17581 tttctggtta tttaccagct attgttatct ttcttgacct ttttgtctg aattacatta
17641 taatctatca taatctccaa tatttaggct ctctcaata aggcttttca aaactccttc
17701 aaaaagcttc ttggtcttcg atcaacgata tggcgagtac tatttaccgg tgagtgcct
17761 cccaaaagtt tctggaacac ggcagttgtt ccacttgaat cagcaaaaaa taaccatcaa
17821 tcacaagaaa aagagacata gatataaaaa gaaaatcccc tgttgacgcc tgatcacaat
17881 cgtctcgctt ctctcattgc tccattgtgc ctattccgcc gcccaacacc gttctacct
17941 gcgtctcact gagcaaccgt tcatcaatct cccatccgac gtcgtcgctc agacagttat
18001 ctcttgatt gcaactgatc acggaacttc ctctctggcc aatccattcc tttcataaa
18061 gaaggatcaa gtgagttgga ggagagattc atgaaaattg tttaaacca aaacgaggaa
18121 aaccgattt tcgtaatgag aatatctgaa aattttcaaa aaaaattatg gctgtgcaaa
18181 gtatttgaaa aataactatt ttcagctaaa atctcaaatt ttgccagttt agaatgtta
18241 aaaaattccg tcagtggcgg cactgacaat ttggcaaaat ttgagatttt agctataata
18301 tgcgcctttt tccaataact tgaaccgcca tgatttttt tgagaaattt tcaaaggctc
18361 tcatcacgaa aattggcagt tttttggtta gtttgggtct aaaaaagcaa tttttctct
18421 ttttccaaat tcgctactac gcctttaaaa aacttaaaac aaaaattagt tcggagcttt
18481 aaaatcaatt ttcctgtttt ttggcatttt caatttactt caatttcca atttccagca
18541 ccacgaccga tcatgcgacg aagcactcaa ttgtccatca ttcatcacat tcgacagccg
18601 tgccaaagca atgtccccag aatttgcgat gtcggaacc ttgaaacaac agcaacgtca
18661 acgacaaaac tcttctcgtg gaactcacag tggacgtgtc tccgaagtta ttcaaacgga
18721 agaagactcg gccgacgatt ctcaggaata acttcaatct ctgctcgtca cttctctaca
18781 aaatcctctc cattcctcga cactcatct aataataaca tttccaatga taagaagaaa
18841 acacctagtc gttcgccaga ctttagcaat attccgggtg cacggttaata atttgtttg
18901 tcttttatgt ctttcaacta tttaaaaata taaatcttt ccattttata gtatcccaaa
18961 atcgatgcca aaaaggaccc gattcctaga aatcagtaag cagcaggccg acgaggcatt
19021 cagaagttgt cttgaaatgg ttcgaaaaa cgatatcgac agttatctag ccattttgac
19081 tatcaataaa cgagcacagc cagaaattgt cgcggtttgt agaaattcga cccaaaaata
19141 gttttaaaat cgggcaaatt cagcttaacg cactgaacgt cgagttggct tcaattcgtg
19201 acaaagtgga cacaagaaaa ggagacgctt cagcaatgta tcgccttcaa ttctggaagg
19261 atgctatttc atcaatctac ggaatatctc cacttctgt accacgtcaa cctgttgcta
19321 ttgctctgtg ctctttcgcc gctggtgcca actctgacat gcttctgaaa ctggttgaaa
19381 ctgcgccagtc aacaattggt gataggcagt tttctgatat taatgctgtg agttttaata
19441 ttgaaaaatt tcgaaaaaat atgtccgaaa aatttaacat attcccaatc gcaaatattt
19501 tgtgattttc ttaaattcaa aagatcgtgc gcctttaagg attactgtag ctcccatttc

19561	ctcatcggtg	agtgattttt	agaagctaca	gtactcttta	aaggcacaca	ctcttccgag
19621	tttaagaaaa	tcgttcgctt	cgagaccggt	tacgggtgtt	ttggagcaaa	aaccagaaac
19681	ttttgcatct	gagtaatatg	tttcttttgc	tctatgaatc	aaagaaaaaa	atcattatnt
19741	ttcaatgcgg	aatttagatg	agaaaaacca	attttggttt	tttttaattc	aaaatgtaga
19801	taaaatagac	aaatttcttg	aaaaaaaaaa	attaaaatta	ctaaatattt	ttccagttat
19861	gcgaatatgg	caaatcaaca	atcggtgtct	ttctgtgcct	acaaatcgat	gctcttgctc
19921	gtaactctcc	agaaactaaa	gtactcccaa	tggcctacga	tggtgcaaaa	gatctcggag
19981	ccgcgtatgc	tatcgccaat	atgattcgtg	ccacacatcc	actactggct	cgtggaatcg
20041	ttcttctacc	agctgatgtg	atgtctttaa	atggtgccac	accggatagt	ctttataaaa
20101	agaagaagct	cgatgagatg	gttggaaatg	caaaagatct	gggtcaacgag	tcaaaacgat
20161	tacttattga	tgctcgaagt	ccgataagaa	tggtaccgaa	agctgtgaga	cctgcgcttg
20221	cagccactgg	agccacaact	gactatatca	ttaaaacaat	cgaaaagaat	aattatgaca
20281	tctactctcc	tcactttcaa	cgctcgaaatc	cacttcttct	ctggtcactt	ttggttcgaa
20341	aactgtgctc	aaaatattaa	aatgtttatat	tttctgtgtt	ttttcttcat	cttcatcttc
20401	tttttttttc	tttctctttt	ccctttcccc	ttctccccat	ttcgtgttct	ctctctctca
20461	ttcgaatagt	tatatattata	tttatggcat	caagtaaaga	gcttacaatc	agtgtggagt
20521	actacgaaga	ctagtaaacg	gataactgaa	tcataacaag	gagcccatcg	taaagaagag
20581	cgggaagaag	aagaatgtgg	cgaattagaa	tgtgcaatac	gagaatactc	gaagatgaac
20641	cctcttttga	attgttgttg	ttgttgttat	tctggaagct	attttttctc	ttgagagaag
20701	agaacatcct	caaaaaaaag	atataacaac	aacaatttga	agggggaagc	cattttttaca
20761	aatttagcgt	taagctggaa	cacttctctc	gaatattatt	ttaaaactac	atttagacta
20821	catttactgc	tcttgcgaa	tttaattta	attccgatta	acctgatgcg	aaatttttga
20881	acaaaaacac	ggaaccgaag	aggtgtgtgc	ctttaaagag	tactgtagtt	acaaaactgt
20941	gctgttgcg	aatttttatc	gacttttcat	aacgatttgt	caaatgtat	ctgttttaag
21001	tgattttatg	tagtttttaa	aaaaataaat	taaaattttt	taattaaata	aaattttaac
21061	aaaaaactat	gtaaaatcag	ttaaaattcc	acaacagcaa	atgattgaaa	ctacagtatt
21121	ctttaaaggc	gcacgctttt	tcgctttttt	caaataaaaa	tttatcgtgt	cgagccagat
21181	gccgtatttt	gcattttaaca	gtaagtacac	aatcaagagc	gcccttacgg	aaaacttcac
21241	ttaatattga	tatataatta	cataaacatt	atagtaaacg	tgcttacctt	tgcgatacgg
21301	ctgttatcag	ttggaaattg	agtatgaccg	gcgaaaaatg	caatcattat	gagaaattca
21361	caattcaatc	agctttttata	cgcagaattt	ccattttaga	atgagaaatt	tctatcaagt
21421	gtaaatcaaa	gaaaattttaa	agtttagcaat	ccagttttga	caccgtttat	tcgggtgttc
21481	atcaattttaa	acatgttttg	aatttttagac	atgttaaaag	gaatctatca	ggtctaataa
21541	tttttagctga	atattttcga	agagaattag	agcagcctgg	aaaaaatcta	aattttttta
21601	caaaaaatat	tactcggaatg	cgaaatgctg	caattttatg	tggaataata	cggtagcagg
21661	tctcgacacg	gccgcataag	tttatatgaa	aatttttatg	cgccttcgaa	gagtacagta
21721	gttttgcgca	gcttttcgaa	ttattttcac	cccctctgct	cattttgcaa	attctgaatg
21781	cattctgtac	atactttaca	aaagtttccg	ttcaacttct	gaaaatttgt	ttgctctttc
21841	cggaggcctc	cgccaatctg	tcaactccaa	tttgctgaaa	atgaactcaa	ttcgttgttt
21901	acaagaaaaa	tgctggaaga	agagaacatg	cagtattaaa	gatgtttatg	tttttgaact
21961	cgcacctcga	ttttttttgt	gtttttgtgt	ctaaaagttct	gggatcagaa	tttttagattg
22021	ttagtgttag	ttttgttgtt	ctttttttgc	aaagaattgc	atttttcggg	gcgttactcg
22081	cttcttcttc	ttgtgattct	gtatgtttag	gcaaaaagtt	cggtaaagtt	tttttgaaat
22141	tgaaggctct	gaagagagat	tttggtgaca	gtgttctcgg	tttaaagctt	ctatgcaaa
22201	tgcatagtct	tcctagaaaa	ctgtccagac	caccgattca	tttttgtaaa	accctgcccc
22261	tcatacatat	tgttttccac	tgttctccaa	tatttttcaa	ctctcctctc	actttcaaac
22321	tgtcacgaaa	tgctgaaaga	gaagctctca	atacctctgt	ctgtctcact	tgatcgcgag
22381	acccctctct	tgtattttgta	cagtaaccac	tgctctcat	cgatccacgt	actccatatt
22441	attgtctcct	gcatacaaca	cacctagtgt	cgcagtgttt	tgaggagcc	gctccctctc
22501	tcattcaatg	caatccatca	atttcccgct	cttgccaaat	acgacattta	ttataagcaa
22561	ctttttttat	tgccctttta	aatttcaaaa	gttttttcaa	ccctaatttt	ttgatctttg
22621	ctagatctgt	tgtttgatga	attttgatga	aaggttgata	tcaagaattg	agctcaggct
22681	cgaaaatcgc	ctatttggtg	gcctaagcca	aatccaaagc	ctaagcgtaa	gcctgagcct
22741	aagccggata	ctaagcctaa	gcctgaaaac	gattcatttc	tcagaaggat	tctcgaaaat
22801	tggttatcat	gtttcatttt	gtatatccaa	tgtagcttct	aatacaatca	tcactaatgt
22861	atcggaacgg	atcgggaaaa	ccgatagtaa	tcggcaaatg	ccattagtct	atccaaattg
22921	agacaaaatg	atgaagcatc	aaggacgcgc	actcctcctt	atctcttctc	aaccgatttg
22981	ccacgtcaga	ttctgtctaa	ctttcacctt	ttttctcgaa	tctccttctt	gccgaaagga
23041	tctatccgtt	ccgtgactcc	agtctttcat	gcactttctt	ctttataaga	aagtgatagt
23101	tgccgactta	tcactgctta	tcactattga	agccacccaa	agaactagat	atcggaaca

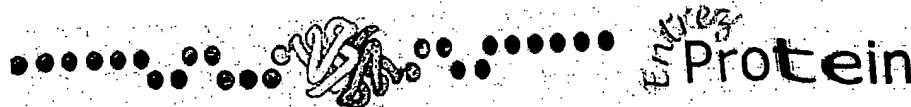
23161 tgtagccgg tacgatgatt cgagacttga aaaacaaggg cttggtgagg cgaagacagt
23221 gatggattac gcaaggcgaa aacataaaac ttgaaacatt tggcgatgat cagaatatta
23281 tcagataaag ttcaacattt cgatttttaa tttttttgtc attcttcgag ttccggaagt
23341 gagatagcct ttttgtttta gaattttgtt tatttttacc gtttttcct taacctgcta
23401 ctgaacccat ttaagtttac tgtagaaaat tggaaacgaa acttcgagta aatttttttg
23461 gtattcctgg gactcactta catttatata atttgtactt tgaaaatttt taaaaatac
23521 tggaaaaaat tctacgataa gcacataatt gatgtaggca cagaattcag catgtctggt
23581 atctatggta tctaagcggc ctgcggtgc cttgcctaag agcttgctta cttccagaag
23641 cacacaggaa acatttatca tttcccagtg gagtttctga caaactaatt tgaaagagaa
23701 gtgtgtatat ctacaagatg caagcgtcaa gtacctaggc aggtaggtag gtaggtagg
23761 agaaaacgtg cctacctatc atgaaagcct caatattgag cattatgcca attaaaaata
23821 caaaaattag ccgagatata attgtttaat aggaaacttc cagaaattca attgaatata
23881 ttgaatgtct ttgttcttga ccccgctcaat gggaaaaaa tcaaatgttc aaaaactaga
23941 aaagtacctt gtgtattttc atattttacat tctaaaaata cgtaaacac gattacttat
24001 gtttctttt ttccggcgaa caatttctcg caaaaggaaa ctatttggcg ttaaaggga
24061 ttcgatagtt tcaattgtta caaggattgc tcaaaaatca ttcaatgaga agctgtagag
24121 caacggcaaa aattgaacaa gtaatatcca atccgtccta actttttcca gagtgggtt
24181 gatttcaatt ttccaactgt aaattgagca cgaaatttca aacttcccaa attgggaata
24241 ccaatgatta ccataatgtt acgactataa gagagctgga ttccgtgtgc tccatctgga
24301 tatgtttgac gtgaaaaggc gggagatttc aggaggaata agggcgaggt gtgaacgggt
24361 tctctttctc tctctctatt ccaacaagcg ttcttcttct cattttctgc ctctcatcca
24421 tctattcatc catctctctc tctgttatcg tcgtcgtcgt gtatgtgaga aagtgcgtct
24481 atttgtatat aaactgtgtg tggcgagcg cttcgccct cccggccag ccgtgcgcaa
24541 gtgatcgacc aattgaggtc aatcggagcc acaaatagaa tctatgtcgg gggctcgtgg
24601 cgggcccgtg cgccgtgatt tttttgttcc tcgcatttta gtctaccatt ctatcgttag
24661 gtatatgtga aaaatttgga gcaatatcgt ttttttaaatt tttaaacgtt ctcattttca
24721 tctagattcg cttaggctta agttaggctt aggttatgc ataggcttag gcttagtata
24781 cggcttaggc gtagtcttac gcacaggctt agacgcaggc tcaggcttag gcttaggtt
24841 aggttaggc ttaggcttag tccaaggcta ggctttgctt agacttaggc ctagtctctg
24901 gcttaggcgt aggtttaagc ttaggcttat gcttaagttc aggttaggc gtaggcgtat
24961 gcttaggcct atgcttaagt tcagtcctcg cgtaggctta tgttcattct tactagggtt
25021 ttaaaccaaa gaaaaccccc taaatcaatt tgtgaccgaa actaaatcga acttcaagtc
25081 gatggcaact gtacatggca actctcgtaa cttccgttat ttaacttcag tgtattttct
25141 caacgtcaaa gctcttttta attttttctt ggacactcca acgtcacgac cagtataaaa
25201 gttcaaatg gtatgtgtct gacctaaaat tgatctaaat ttagtttcat agaattttct
25261 catctatcaa atggtattca tgtgtttata actatgaaat tgtttcccc ggtggaata
25321 taaatataaa caccgaaaac gcattgttcc aaaaatagat gggctgtgtg gtctaaaatg
25381 gtttggttat atgttgacca agtgtttggt caatatcaga atgtatatat ctatacacat
25441 cataagagtt gagtaaaaca ttttccaatc aattccaatc tcaagccgat ttaattttag
25501 atattttaaa ccattggtct catttttatg caaccaaacg gtccaccgga cgagttgaaa
25561 aagaaaacag tgtgcaattg ctaaaaatag ctccgaagtg aaacgtgggt gtccctaaat
25621 tgatctgctc aactgttgac tgggtctgag caatatatct gtgtgaagca tgcattgcgaa
25681 gccgcaaggc aatagttact gaattccttc taggtcatcg aacaggtttt tattacacat
25741 ttgcaaccat ttttttctga tgttctagat ctgctacgaa cttggaatgc aattgggttca
25801 tttttgagat caaacttgca gttcgaaaat accttttcat tttgtttctg tagctcgtca
25861 taatttagga attttgttat acatatcact gtaattaaaa agattcttgc tattttctaa
25921 aaaatcttaa ctgctctcca cggaaactgt gtatgagcct aagcctaagc attagcacia
25981 gcctgagtc aagcctgagc ctaagcctga gcctgacct aatcctaaac ctaagcctaa
26041 tcttaaaatg ttacaagaag gtttttctt gcgcttgag cgaaaaagaa aagaaaaaga
26101 gctattttaga cttagggtgc ctaactggaa taaaacattg gaaatcccaa tccaaccagc
26161 ctaagggcc gaaaaacata ctaggatgcc caacttgaat aaaatattgg aaatccttat
26221 gacacactta agcctaaggc cccgaaaaaa aaactaggat gcccaactgg aataaaatat
26281 tggaaatcct tatgacacac cggcggtatg gcgcggttca agcctaataa gccactttta
26341 tcaaaatata tttgagctcg tcgtgcgttt tacaataact tctcaggcaa ctcaaaagta
26401 atctgtggat atttttcagt aatctaaatg aagactatag attactaaga aacttgagga
26461 tttcataatg tttgggggga tgcgagcatc tattggagat ttgccatttg atagaacttt
26521 tagcggcaaa agtccaaaac aaagctcaca gtgggctctc aaagatcatg aaatagcact
26581 gtaacgaaga actttaacga tctaacgaag caattttcca aattcacttt ggcagctcat
26641 atctccgtgg ataaaatttt tacagaaaag tcatcaactg ataagttgtt gatattgtt
26701 tatagaacaa gttttaggtt gaaagttttt tttacaaaaa aattttttgtt tgagagaaaa

26761 gcattagaaa cggaatagcg tcataaaaaat aacaacagca gttgccgcac ttcattgcggt
26821 tttatctcaa acaaaagcgg agatatgagc taccaaagtg aaattggaaa attggccctc
26881 caatgcttcg ttaaagtgcg attttcagga tctttgagag cccgccggga gcttggttct
26941 ggagttatat tgatcaaatt aacctccag taaaggggga cctttgatga atataatcac
27001 tctgatggta ttttaattccg atgagtaatc ctttttctt tttctcacat ttgtgaacca
27061 aaaataagtt ttaaataaag gcgggatatt ctaagggtg ataacatatg atattttatt
27121 ttaaatttaa ataaagtttt tttttatttt tgctaaaaaa cgaatagttt acaaccgcct
27181 cgctcaaattg ttttttgata aaagtggcta ttttaggctta agccgcgcca taccgcgggt
27241 gtgtcataag gatttccaat attttattcc agttgggcat cctagtatgt tttttcgggc
27301 ctttaggctc aagtgtgcca taaggatttc caatatttta ttccagttgg gcattcctagt
27361 tttttttttc ggcccttag gcttaagtgt gtcataagga tttccaatat tttattcaag
27421 ttgggcatcc tagtatgttt ttcgggccct taggctggtt ggattgggat ttccaatggt
27481 ttattccagt tgggcacct aagtctaaat agctctttt cttttctttt gcgctccaag
27541 cgcaaggaaa aaccttcttg taacttttta agagggttc atatatatta ttaaaatcgg
27601 ggcgaagccc tgattttaaa tccatattgt tttttttgt cttccactat ccctgcaaat
27661 aggaagaga atgtgttgt tctgatgaag taaaaatcat cataaaatct tgaaaactga
27721 gagcaggagg taatatattga atatatggg ttggaaatgt gtgtctccct gtgggtgggg
27781 tggcgatgtg ttggcatcca acccttcaac gaactgtatc tccgcctgt atctccctc
27841 aaagtaagaa ttgggttaca aaaatttggg ggaatatgaa aataaatgta aggatttcaa
27901 aaatgttaat tttgaaacac cagaccaaac cactttttct gggcaagagg caaaaaatta
27961 attttttgaa aaaatttcaa actggcaca aattttttca aaaataaatt ttcacaaatt
28021 tttggtagat ttcacttttt ataaatattg ttcattgaac acagaaaaga aaacgaagat
28081 tcatcaaaaa atgagtgaat aatcgcaaaa attcgaaaaa gtccgtgctg aaaaactcga
28141 ttttggcggg gctgaaaaaa attgctacta aaattttttt tgaaacttag tttttcggat
28201 ttagcgtcaa attttgaatc tatgtaaaaa acagaattaa aattgatctc agattgagtg
28261 agtaataaac gctcaaagtt gaaaaatgaa caacgcaaaa acggcagtaa ctgtctcaa
28321 agtcgggttat ctacgtgagt tttcactcaa ttttcgaaat ttttttgctc tatcgttta
28381 gaaatatattg taatttcatt ttttttctc aaaaatcaaa tatctcaaac gaccgccatc
28441 ctacgagaag ggaaaaaaa aagtttttgg aaaaaaaatc aaaaattttt tttctgcctc
28501 gatttttcaa atgaaaaaat cactttttcg gaataatttt tactttaaaa tgtacctacg
28561 atctttttat acaacaattt cacttttgga ccaaagattt ctcaaagaca acagcgacg
28621 aagcgggtgt ttgcgaaaaa acacgaaaaa aacacaccga agtgggaggg ggaggtcaaa
28681 attgcgaatt tgactttgga gctcactaaa agagctcata gctgatggat ctggatgatt
28741 tgtatgtttt tcgacgcac tcgtcgagta ctatatactg ctaaaaaatc tcgtaaaaaat
28801 cgcaaaaact cgaattttcc tgcaaaaaaa aagaggcgaa aaatgagaaa aaaaacgtga
28861 tttttggagg atactcgaaa atactcttca tatctcggct caaagagctc caatctttct
28921 gaaataaagc atacagaggt ggggcaagct tcttgaagag acagcaaaaa accgcatcaa
28981 aatccatcca cccaccgtca agttacacgc gcgttttcaa agtgaacaaa aaacagggca
29041 taaaaaaatt tagacgccc caccgggact cgaacttttt ttatatatttg aagcttaata
29101 tctcggctcc tgtacatcga aattggctca aaattcacaa gaaaccttat cctgctacga
29161 tctcctgtc attaaatttt cgtgagctta gaccgaaaaa tgacaaaacg ccaaactttc
29221 aaattttaaa aaatagttga gggtcatttt gaaaaacact taagctccat aactcggcga
29281 gttttgatgc aatcaatttg aaattttaca cggaagcttc ttagtggcct atactctct
29341 gtgttaaatt tcgctttgat cggccaacgg gaaccctttg aaaaatgaaa aaaacgttat
29401 aaacccaagc cttaaataag ctacgcctcc cccactgacg ccaagcctaa gtctgacct
29461 attcctagta taagtctggc ctgaacctaa gcagaaatac ctctctctgt aagttccgc
29521 caaacatatt cttttctcac tttcattttc caaaaacttt ctcccattcc gactcttcc
29581 tccggctcga ccgtccgctc cgcttctca gtctctctgt tcccttttct ccatctttcc
29641 gaatatccga ctactttaca caaacaacaa aacaaaagtc ctttgcgaaa agcacatata
29701 ccgtccctc atacatacac tacaagagag ggggccccct cgttttccct attgattccc
29761 cttctctcgc tggctactca ctctcttatt tctccccctt tttccatttt tatattcacg
29821 attcaatgtg tcatctaaac cttctactag ttctgaacta ttttttctca gtttttttc
29881 ttttcgggaa tgtttgtcct ttgaagtga ccacgatgac cgtaaccact tttgtacact
29941 atttcataat tttggagtct caaagtgtga tctaggtttt ggtggttttg agcggagggg
30001 cagccattt ttttggaatc tagttcttat tgttagaagg gtaagaattg tgatcttgta
30061 gacccaaaat attatgacct caaaaaccag tcatttctact tatttgaaaa ccaggggcca
30121 aacattttgt cttctactat aaaattatct ctgattatat ctactgcttc aactcatcct
30181 cagacctacg tgctacgtg ccatgtttct tgtatgattt cttaatctca ctgaattttt
30241 ttcctatcat tcggccgtaa gatctctgcc aaaaacttta gcaacttttag gaacttttaa
30301 accaaatttt gccagttttc tgtaatttta agtgagaatg tttgtaaaac caatttgtgc

30361 aactagcatt tctctagatc ctagaagcct agatcctaaa gttggctcgag aagttgcgta
30421 agatcaaaact agctagtaag atctctcgat caaagaactc cctatccggt tcctacctaa
30481 aacctggtt tgtgccttct ttcaggcta cctatacatt ttgatctatt tcctcatagc
30541 tcaaataaat tcaccaaat tattcaatct tgacgaaatt tttctgtcag ttgatctata
30601 agaagcatca aatggtgatc tttcgaaaaa ttgaaaatac tatgaggaat ataaagtcta
30661 aagatccggtc tcagaatgac aaatgattcc gtttttgac aaacatcgtc tgacctggc
30721 ggaaacggtt tctttactta tttccttagg atactttctc atgttaaaaa aattgggtata
30781 aagttcctga atcaacagga accaagcagt atgggtggtc tggctttgac cactctggct
30841 ttataatgtg gctgaaaatt ggtaactatt tgggtgatca aaacatttgt cgcacactct
30901 gacagttatt gacagtctat ctttctatct ggtctacagt aacctacag tatccctaga
30961 gtatacagta gcccgtaact tctctctacc aaaaccaact gttcctcaat tgaaatacaa
31021 aaaccttta aaaaaacaaa aaaaccctaa caaaaaccca tcctacagca ctcataggt
31081 actacagtac ccctgcagta ctacagtgtc cccacattac tcctacagta tccctaaact
31141 aacctactta gtatagaaac tttaaattcca tgtattttgc tagttgacaa ttttttgatg
31201 tttccagttta aattggccaa agcggaaact atacttctt tccaaattc tgcaaatttg
31261 cgtttttctc tagttttatt tgaaaaaac ccaatattta attagattac ttctgcaaca
31321 ttatcactca tctcatgacc ttccatcccc tcttttttca tgttcacctt gagaactcgt
31381 aacacaaatc aaaactgtac tcttctccc cctcccgccc gcgatcactt ttctcattgt
31441 ctggcgctg taaatggtag caaagctgg ttgtaatcat aattacactt tgacatttca
31501 ctggttgcac tgttgcaat cactcacttt ttccattttt ctgctgacc tcctcattgc
31561 agatggacga actaatcacc ctggaaggtg cttctcaatc tgaacaaatc attggatccc
31621 atgatttttg caacttttcc aatatcacc atcatgagca cgatgagcaa tcgatttcca
31681 ttgtctggtg gagcaacgtg gcagttttac ccgtgattgc tctgatagga ttggcttgta
31741 atctacttaa tatggcggtg ctgacctga ataaacagc acgccgaatc ccttctgga
31801 accttttaat agctctcgca gtatgtgata gcttattttt gatatttgct actctggatg
31861 taactccatt atctattcca tcaactggcat tttccacttc tttcaatcat ttttattcaa
31921 gaattgtgct ttatattcgg acattggcat caactttcta caaagcagt gttttgtaag
31981 ttttagtttt ttgaaatttt attttatttt aaggctgtaa tattccaaaa agtaagtttt
32041 tggcaaaactg ccaaattttg gaaaaaatta ggcatgtata taggcatgta tgacctattt
32101 tttgattatt tcatacatag ttgttcaatt taagattttg aagctatttt taaccttcat
32161 ttcaaaaatat aatcgaaacga ctcaaattcca tttccacata gcatttaaat tatttcacat
32221 ttgcctaata ctttttttca attttgcaag tattccagaa ttgttggtgc cttcaacatt
32281 gaacgttacc tgtgcgtcgt ttgtccgcta aactcgcatc gatggtgtac ttcaagaaac
32341 tcgaaaaatg cgattgccac tgcgttaagt ggggttctat ttttagcggg attatttgta
32401 aatctataag aaataactgg gtcaacagtt ttggttaatt gaagttatga ttctaaattg
32461 tgtgtatttt gaaattccag ggagttgaag atccaggagt tatggtagt acgcagaaag
32521 tccaattgtt ggaatatttg gaaatttaca aaaactttta attaaaattt caaaaatcta
32581 aaactgcaca ttgtagtgt ttgttttgt caaaaaaatc ttccttccag ttttaagttt
32641 aaaatgtgtg cataacaaaa cttggcataa ctcgattaat tccagaattg tgctctcatt
32701 cctgtgctcc attcaatggc cattggccta tgacacaatt cgttgtttcg aaagcaattc
32761 aatcaatac tactacgtga ttctaattgc gacaaaccgt gctcttcagg tatttaccat
32821 gttcttcttt cctacactct ttttttttcg tttccaatgg cattgtggcg caaagtagta
32881 acttgatata cgccactgag tttgtttgta attagaaaag cttttactta ctgtttggag
32941 aaggtaaatt agaaagatgg ggaggtagga atctttgaaa ttatttttta gaatcaaaat
33001 gagcaaatcg gatttgcaca aacacattga gaagtaaaca taacaccoga ttagttaga
33061 gtttgtgact ggaatgacta attgtttgtt tctatagtaa ttcgctgagc aggggaaaaa
33121 tggcgggaga atagaggtca aaaagatgat aggttaattat gagtcagtt ggttttaggt
33181 ggaaatttat ctaggacct ttgatgggac ttgcaacata agaactaatg tatcgttttg
33241 ctctttttag aaattaatat agtaattgtag agtaatttt taactttctg aaaacaatgt
33301 tacttttact atatgatttt ggaacattgc tcaaaaaatg ccattaaagt tgcaatgtga
33361 tgtgcgatca gaacattgtg actttgaggc agtagttgag caatttttga aaatgttcat
33421 taaaagtaaa gttattttca gaaagttcaa atattgttct atatttccat atacgttttt
33481 aaaaagaaaa cttcgacaac catgagaaaa aaggaatttt gtgaaacaag ctggaaatta
33541 gatctcgaca atttttgaaa aaaatttttca attcaaaaat tctagatttt atattttgta
33601 tttttcaaat caaattttatt cataaatttc caattttttt ccagattttac taccgaacaa
33661 tggactatgt gtctttattc gctttcaatg tcttcccaat tattggtctt ctctacatga
33721 attctcgaat aatcttctact cttcgcagag ttgttgatga agattcaaga aaatacgaag
33781 aaaccaaact ttccgatggt ttgattcagc atgatgctca taacaaccga actatgagag
33841 caaatgcaat gcttttcgca gtcgtcttca tgcttttctt ctgtgttgga cctcaggctc
33901 ctgcaagaat tctgttcgat atgtatggac agtatcatcc aaaagccata ctttatgtat

33961	gtttgagcca	acaactggta	ttcctgaatg	cgctactcaa	tttctgtttg	tattgtgttg
34021	tgtcaaagag	atattcgaacg	ttgatgaaac	agactttgaa	gaagttcttg	cacaaacttg
34081	aagggtgagca	acatttttgaa	attttgtcga	gctcgctcgg	catggtgtgt	tgaagttttt
34141	ttcctggaaa	tgtaagaaga	aatatagaaa	aatatttgaa	ttatttgaaa	atgacttttt
34201	caaattttaa	ttttaaaaaa	ttgctcaaaa	attgactcaa	agtcgcaatg	tgctcgagtga
34261	atatgccatt	tgatatatcg	atatttgatt	taattcttga	gcaaattttt	acaaatttca
34321	tataaaagtg	aaactatttt	tagaaagtac	aagtattttt	ctatatttct	atataaattt
34381	ccaaaaaaat	acttaaacat	aacgaagaga	aaaaagggcc	tgaaaacggc	cttacataat
34441	ttcctacttc	atgctttaac	taaagtgtga	tatattccaa	ttttcaggag	tcgaccatcc
34501	attccaaatc	aatctgaaac	aaacaaagag	cagctcggca	catgtgacat	ctcttgagga
34561	tcatcatgct	cacctcattc	aaaatgtcta	gatcatactt	gcttactcaa	atcagataca
34621	cgggttctct	ccctcattcc	tagcattttg	cacatacata	tatgtattac	taggttcatg
34681	ctttatatgt	actttttattc	cacgggtttt	accttgattc	cagtccttgt	aattagaatg
34741	atgatcttcg	gagacagaga	ataaatcggg	attgtttttt	gatttcttga	tgattggtga
34801	atggtgatga	cgtgaagggg	aaaggtgtgt	tttggatgga	atttgacgat	tttcagacgt
34861	caatagagaa	gcttgattgg	gggtcatcgg	ggaattatag	gcgctaatta	ttgaatgaaa
34921	acaatgacga	aaaatgttca	aagctcagtg	atctatagcg	gaaattagtt	aagagacttg
34981	ccaaattact	tatgcacatc	tttcaattaa	tctgagtggg	tgtttacact	tgagagaactg
35041	tatttgatag	ttttattttt	acaaaaaatg	tgtcaaaagc	cataaactat	atgcagcaaa
35101	tatcttttaa	aaattaaaaa	aaaaactaaa	tattaaacaa	aaaagttaac	atttttattc
35161	actgtcaaaa	aatggcaacc	actcaatttt	cgactatcaa	aaaaaagaat	cgaaaagtgt
35221	atattacaaa	ttttttttac	tgatttttagg	ggatcaaaaca	tgcaagaatg	ctcgaaactt
35281	ctttgaaagt	ccaatttttt	aatattccaa	tttagcaaaa	ctgacagtaa	atattgaaca
35341	tttttaattt	ttttggtaac	acatgtagtt	gtccagttaa	tttgaaactt	gccaatttca
35401	agattacttt	aataattact	gcacaatctc	tactagaatc	gattttttga	tctaagaagt
35461	ctttttgaat	tttcaagcct	tggtgtttca	acagtttgta	acgtcaacta	aaaatatgta
35521	taatcttaaa	gtaattttta	actcacatca	atagacttga	acttaccaag	gtttccgtac
35581	tgttgttttt	catgctgtac	ggcatgcaaa	attattttatt	tgaatacagt	taattgcaat
35641	ttcaccagta	gatattatca	atttcttttt	ttttccaaaa	acatcaagct	cgaaaaatga
35701	taaaaccata	gttttttttt	caattttattc	gaaattttct	cagtaaaaaga	ctgtcccatg
35761	acttcatagc	ttcatgtagg	cgtaatagct	tcaattcata	ataaaaaattg	ttctagatca
35821	ccgactctgc	cctcccacat	ctcaacgtct	cccgatttga	aaatttcttt	gctcttcgct
35881	cgccttctct	gtcgtcatcg	acgcgaatct	aaccagatat	cacttcgtcc	tttcgtaact
35941	ctaaatatat	catatcttag	ctatgaactc	gtcttgcaaca	attatattca	cttattggga
36001	ttctttgcaa	tttcaagcgt	cattttccca	tatcataatt	tgtatcactt	ttccaattaa
36061	cttgtttggt	ggatattgta	ttgtaaagaa	aacaccgagg	aatcgaagaa	gtgccagatg
36121	gtatttgctg	cattttacatg	cttggtatgt	agactactta	ggcttagttg	attccaggga
36181	tgagaccggg	caattctaca	aaataatcat	gttcttcttt	aaagttttagc	gatgggattt
36241	agaaaaatat	ttgttttctt	tatctgatag	tcattttttat	tttaattgaa	acaattgaaa
36301	aaagtgtctg	aaaatgcttg	aaaaaactg	ataatctgtc	ggtttttttt	tcaacaattt
36361	tcaactttta	gataattttt	gagcgttttt	tagatagctc	caatttaaact	aaaaattatt
36421	ttcagataat	tcaaataattt	ttctagattc	aaatattttt	tctagactaa	actttaataa
36481	aaaattttga	gagaaaatgt	cccactggat	cattttgtag	aatcgagta	agctgacaaa
36541	cagaaaaagt	gtaatgaaaa	ctttggagggt	tcaaaaaaat	aaatgttttg	aaatatatat
36601	ttaaataaat	gctccagggt	acttgaataa	ggcaaaaaagt	atttatatac	acttttaaat
36661	tttccgacgc	tacttgata	actctataag	ttttcaatat	tattttgtaa	aacttatagc
36721	ttttaagcc	tggtccaaa	ctcagacatt	catagctttc	ccccatctcc	aaaatttttc
36781	tctcattttt	caggacaatc	ctcacagact	tgctcatcgg	tggtctcgtt	tgctcataca
36841	tgtttttccc	ggtactggtc	ggtatttccg	ccggcggtgct	cagttgggtt	tcagttcccg
36901	tgtggattca	ggtgttttgt	gcacaacttg	gattgggtgg	tcagttttgt	ttttttggg
36961	agagatgaca	acaataaaca	aatagagttc	gcccacgggg	accggggggac	gaggaaaaaa
37021	cttgtttagag	ggtttttgag	caaattgtta	tggatatcag	tgagactttg	agggatttgg
37081	gaaaattttt	ccctacgtca	taaatctatc	tgcaacatct	attcttagtt	agaataatc
37141	gagagcaaga	aattattgaa	gcgtgcctaa	caacttcaca	gaaattttat	gtttgtttag
37201	ggacgcttca	aatagtttct	agtctcta	gattttttgt	gattttctgca	aattaaactt
37261	ttaagcta	taaaaaattcg	cgtgactgag	ctgttctgaa	aatctgaatt	tgaaattcta
37321	attttgaa	gtttagcac	aaatgagatg	agcacatcaa	gcatttcac	tttcatttca
37381	ttgagcattt	cagtcataaa	acacattaac	actgcactga	actcgccaca	aaaattaaat
37441	ttcaaatttg	tttttctcaa	cgttgtatcg	acgttttttt	tttgggaatt	tgcataaaga
37501	tatagaaaaa	attttgaatt	ttttgaaaat	aacgggtactt	ttaactggaa	atcttcgaaa

37561 aattgctcaa aaacctactc aaacatcaac gtgccgagtg aatgtgccaa ttgacacatt
37621 gaaatttgag tcagttttta ggcagcttct tgaaaaat ttttgaatt taggttttta
37681 tcggaaagta cacatctttt tctatatcat caaataactt ttccaaaaat aacctagaca
37741 tgtcgattag aaaagtgggg ttttaaggga caaattttga aagtaggttt caaactttca
37801 gatgctctaa gaattacaga ctaaccatgt gattaacaga ataaaaaatg ctattttcca
37861 aaaaacctca attttctgaa attccaggtc tcgccacggc tatcgctcatg cttttcgaaa
37921 atcgccacaa tacgctgggtg cgcggggagat ttaaaattga agccaactgg atccgataca
37981 cattctacgc cgtcaacgga atctatgcgc ttcttttttt actaccagtt tacttcagaa
38041 tacctgatcc agaattggga aaactgattc ttctaaaagt agtctgtaga cttttataac
38101 ttattgaatt tcaatgttcc tatatttcag attcttccgt gccctcatcc gtcataattt
38161 caatcgaatg tttttgtttt ttcaatggat atatcgtcag ttactgggac ggctggaata
38221 tttttgctat tttttctgac agaagtattc gtactttgca tccattcaag ttattttctg
38281 atgagcttaa aaacacacat gtcaccaacc accagaaaat tacaacaaaa attctttatc
38341 gatagatttt tccaagttag cttttacttc tgttttcttt aatttgaaag catttgcgcg
38401 catcaatcaa caatgtttgc cagccttcc gtgtatcgct ggttggtcgt atgaaaatta
38461 acattttcag gtttcaatgc ctgtcgttgt catcgttttg cccatgatct attgttttta
38521 ttcaattggt tggcagcagt ataatcagag taagtcagtg tgcattccgac cagctaaacc
38581 ataaaaattg attctcccg ccacacatca caagctggga ttgctcccaa aatataagag
38641 acttccccca acgtggggcg taactttttt tgggcgagta gcgagcaaca gcctacctgc
38701 ctgccgaccc gctttgcatg cctacaatgg gcagtaggcg actaactggc gagtagtagg
38761 cgactccaaa tgcctacca tacctatatc cctgccatac gtgcctgcat aatatcccca
38821 gatctctcac ataactgta catacgttca gtgttcaaca acattgcatg aatgtgcata
38881 tctctacacg gaatgtgctc aacctacaca atgatctgcc tgaatccaac atatcgctcat
38941 tttacacttt ccgttttgac gtgtttctat tatgatccaa ctcttcgaag aagctccgtg
39001 atgaccgtgt cccccgccac cgttacacaa caaaaacatt gaatttttta aacgtttttt
39061 ggtgataata aaaaaattt ttaagttgaa acttaattta tttctcgaca attttcatac
39121 ggcttcttgt ttcaattcaa caactcggtta atttttaatt tctatttagt cttgtatggt
39181 gcgaattact ttcaaatgaa ggttccgcaa tgatggttgt gcctttaagt agtaaaagtaa
39241 cctattttct cgtaatcaat agcgggaaat tactagggtt actgtactac tttgaaggca
39301 catgtgtagc ttttttgca aaatattttc gtggcgagaa atttgagtct ttcaaagttg
39361 accgatttac agacaatgac tcattctgtg gttagttcgtg aaaatgtgaa atccgaatat
39421 cggatcggtgc tccgaaacac ctcgatttac gacgtggcag tgaagattgt gaatccgaac
39481 gaaagcccaa agcttgagcg ttacgaatgc ctggttctat ccaataagta cacggaagtc
39541 gcaatccttg aaacaccgtc caaagccgct ctgctcagga acaagccggt cgagatctac
39601 gctagggcca tctaccgta caatcgcaaa aacattcgcc attggattga aggacacgtg
39661 tcggacaagc cacatcatct cgtccagtcg ctcaattttg tcgccgacaa tgcagagtat
39721 tcggcgaaaa cggtaaaaaa agtttaacgc agtcagcagg attcgaacct acgcggggcag
39781 agcccaattg atttctagtc aatctcctta cacaggtgat tcgccacgga cgcataatgc
39841 ctcaagaccc attatgcgcy tgtttgcgaa cgaggacctc acattatgtg cgtttttgcg
39901 aagcgttcgc agaaacgagc ataatgcctc gccgatgggc acaatgcgaa cgctcgcaat
39961 gtgcgcattt tgtttggcgg ttattcccat cattaaagcg ctcatttcag ttagtttaaa
40021 gctattttta tttgagttct ctggtttattg actgtttttt tgctgatact aaagtttctg
40081 aaaaacaaaa ctctcgattt agaaggaact tgtcagattt cgaaaatcat aaggtccac
40141 ccttatgata taaaattttt gatgaaattt ttttgtttg aaaattttt cgaaaaacatg
40201 ttgaacgtgt agaaaatgat cagtttgata tttttcacia gtgtgagagt tcacaatgaa
40261 tgttcagcca agaaatcatg gaaagtctag agttgggtca tttccgttgt tcaaggcatt
40321 gtgcaatccg aagacaaaag tcgagacggt ggcacatggg gagacaaagt ctaaacttag
40381 tgaaatgaaa acttatgtat cgaataaaaa tgtatctgaa ttacatata tcaatgagat
40441 aactacaatg atattctgaa atatacaaga aattcaaaaa ataaacacag ggagagagga
40501 gagagaggtg ttgagggggg tagagataacg gcgggttaac gaatcaaaaa tatttggtga
40561 cacggaatgt gttatattat tagataacag aggtttcagt agtgtttgac tgcgtggaag
40621 agccaattcg ttttggtaga ccatgatcca ttgaaggctt cttcgtagat tccagcgaaa
40681 aactttctcg cttcttcttt gcttttctca ttgcagaaga gggttttctg aaaaaaaaac
40741 aaattaaaaat atgaagaaga aatgctaata agaaatgtga tacttttcat caaaacgaat
40801 ttattaccca gacgaaagac tgtttttttc tctagaaata cggtagccgg tctcgccaca
40861 ataaactttt gtttaatgca aggaagtgtg cgcctttaag gggtagctga gtttaaaaaat
40921 ttaagtgttt tcattgtgtc atttgagttt tcaagcaatt aatttttttt aatcgcaaaa
40981 ctatgaaaaa tcaatgcaat tttttttcag tagcaacaag ttttcgaact acagtactct
41041 ttattgaagg ggcacaccta tttgcattta acaaaaaatg tcgttttcgag gccgggtacc
41101 gtaattttga cggtaatat aataatatgt ttacctactg attttattag ttttttattg



Protein

Entrez

PubMed

Nucleotide

Protein

Genome

Structure

PMC

Taxonomy

Books

Search for

1: CAA91377. *C. elegans* AGE-1 ...[gi:6018364]

BLink, Domains, Links

LOCUS CAA91377 1146 aa linear INV 23 -OCT-2003

DEFINITION *C. elegans* AGE-1 protein (corresponding sequence B0334.8).
[*Caenorhabditis elegans*].

ACCESSION CAA91377

VERSION CAA91377.2 GI:6018364

DBSOURCE embl locus CEY62F5A, accession AL110499.1
embl locus CEB0334, accession Z66519.2

KEYWORDS *Caenorhabditis elegans*

SOURCE *Caenorhabditis elegans*

ORGANISM *Eukaryota; Metazoa; Nematoda; Chromadorea; Rhabditida; Rhabditoidea; Rhabditidae; Peloderinae; Caenorhabditis.*

REFERENCE 1

AUTHORS none.

TITLE Genome sequence of the nematode *C. elegans*: a platform for investigating biology. The *C. elegans* Sequencing Consortium.

JOURNAL Science 282 (5396), 2012-2018 (1998)

MEDLINE 99069613

PUBMED 9851916

REMARK The *C. elegans* Sequencing Consortium.

REFERENCE 2 (residues 1 to 1146)

AUTHORS Swinburne, J.

TITLE Direct Submission

JOURNAL Submitted (27-OCT-1995) Nematode Sequencing Project, Sanger Institute, Hinxton, Cambridge CB10 1SA, England and Department of Genetics, Washington University, St. Louis, MO 63110, USA. E-mail: jes@sanger.ac.uk or rw@nematode.wustl.edu

COMMENT On Oct 11, 1999 this sequence version replaced [gi:3873748](#).
Coding sequences below are predicted from computer analysis, using predictions from Genefinder (P. Green, U. Washington), and other available information.
Current sequence finishing criteria for the *C. elegans* genome sequencing consortium are that all bases are either sequenced unambiguously on both strands, or on a single strand with both a dye primer and dye terminator reaction, from distinct subclones. Exceptions are indicated by an explicit note.
This sequence is the entire insert of clone B0334. The true right end of clone W02B12 is at 4181 in this sequence. The start of this sequence (1..104) overlaps with the end of sequence Z66521.
The end of this sequence (41657..41812) overlaps with the start of sequence AL110499.
For a graphical representation of this sequence and its analysis see:- <http://wormbase.sanger.ac.uk/perl/ace/elegans/seq/sequence?name=B0334>
IMPORTANT: This sequence is NOT necessarily the entire insert of the specified clone. It may be shorter because we only sequence overlapping sections once, or longer because we arrange for a small

EXHIBIT C

overlap between neighbouring submissions.
[020104 dl] Sequence correction based on Thierry-Mieg EST analysis.

FEATURES

source

Location/Qualifiers
1..1146
/organism="Caenorhabditis elegans"
/strain="Bristol N2"
/db_xref="taxon:6239"
/chromosome="II"
/clone="B0334"

Protein

1..1146
/product="C. elegans AGE-1 protein (corresponding sequence B0334.8)"

CDS

1..1146
/gene="age-1"
/standard_name="B0334.8"
/coded_by="join(complement(AL110499.1:6114..6178),
complement(AL110499.1:5742..6027),
complement(AL110499.1:5129..5689),
complement(AL110499.1:3804..5080),
complement(AL110499.1:2872..3132),
complement(AL110499.1:2446..2820),
complement(AL110499.1:350..700),
complement(Z66519.2:41436..41568),
complement(Z66519.2:40596..40727))"
/note="contains similarity to Pfam domain: PF00454
(Phosphatidylinositol 3- and 4-kinases), Score=271.3,
E-value=4e-78, N=2; PF00613 (Phosphoinositide 3-kinase
family, accessory domain (PIK domain)), Score=41.6,
E-value=6.8e-10, N=1; PF00792 (C2 domain), Score=96.6,
E-value=1.6e-25, N=1; PF00794 (PI3-kinase family,
ras-binding domain), Score=141.9, E-value=3.7e-39, N=1;
PF02192 (PI3-kinase family, p85-binding domain),
Score=172.3, E-value=2.6e-48, N=1
cDNA EST CEMSC28F comes from this gene
cDNA EST yk152c9.3 comes from this gene
cDNA EST yk152c9.5 comes from this gene
cDNA EST U56101 comes from this gene
cDNA EST yk192d4.3 comes from this gene
cDNA EST yk260g10.3 comes from this gene
cDNA EST yk302a12.3 comes from this gene
cDNA EST yk355b7.3 comes from this gene
cDNA EST yk360d11.3 comes from this gene
cDNA EST yk192d4.5 comes from this gene
cDNA EST yk260g10.5 comes from this gene
cDNA EST yk302a12.5 comes from this gene
cDNA EST yk355b7.5 comes from this gene
cDNA EST yk360d11.5 comes from this gene
cDNA EST yk543g10.3 comes from this gene
cDNA EST yk543g10.5 comes from this gene
cDNA EST yk601d4.5 comes from this gene
cDNA EST yk847g08.5 comes from this gene
cDNA EST yk1126g04.5 comes from this gene"
/db_xref="GOA:Q94125"
/db_xref="SWISS-PROT:Q94125"

ORIGIN

1 mhvnihlpql qtmveqwmr erpsleteng kgsllleneg vadiitmcpf gevisvfpw
61 flnvrtlsle iklsdfkhql feliapmkwg tysvqpdyv frqlnnfgei evifnddqp1
121 sklelhgtfp mlflyqpdgi nrdkelmsdi shclgysldk leesldeelr qfraslwart
181 kktcltrgle gtshyafpee qylcvgescp kdleskvkaa klsyqmfwrk rkaeingvce
241 kmnkigiefn pnetpksllh tflyemrkld vydtddpade gwflqlagrt tfvtnpdvkl

EXHIBIT C

301 tsydgvrse1 esyrcpgfvv rrqslvlkdy crpkplyeph yvraherkla ldvlsvsids
 361 tpkqsknsdm vmtdftrptas lkqvsldld anlmirpvni sgfdfpadvd myvriefsvy
 421 vgtltlasks ttkvnaqfak wnkemytfdl ymkdmppsav lsirvlygkv klkseeefvg
 481 wvnmsltdwr delrqgqflf hlwapectan rstrigengar igtuaavtie issygggrvm
 541 psqggytylv khrstwtetl nimgddyesc irdpgykkkq mlvkkhesgi vleedeqrhv
 601 wmwrryiqkq epdlilvlse lafvwtdren fselyvmlek wkppsavaal tllgkrctdr
 661 virkfavekl neqlspvtfh lfilpliql kyepraqsev gmmlltralc dyrighrlfw
 721 llraeiarlr dcdlkseeyr risllmeayl rgneehikii trqvdmvdel tristlvkqm
 781 pkdvatmklr delrsishkm enmdspldpv yklgemiidk aivlgsakrp lmlhwknknp
 841 ksdhlhpfca mifkngddlr qdmlvlqvle vmdniwkaan idcclnpyav lpmgemigii
 901 evvpncktif eiqvgtgfmn tavrslidpsf mnkwirkqcg iedekkkskk dstknpiekk
 961 idntqamkky fesvdrflys cvgysvatyi mgikdrhsdn lmltedgkyf hidfghilgh
 1021 gktklgiqrd rqpfiltehf mtvirsgksv dgnshelqkf ktlcveayev mwnnrdlfvs
 1081 lftlmlgmel pelstkadld hlkktlfcng eskeearkff agiyeeafng swstktnwlf
 1141 havkhy

Disclaimer | Write to the Help Desk
NCBI | NLM | NIH

Nov 3 2003 07:26:36